CQ, The Radio Amateurs' Journal

April, 1957
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- *Built-in VFO—pi network output circuit.*
- *Easy to build—TVI suppressed*

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$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

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The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

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For further information, check number 22 on page 130.

Feenix, Ariz.

Deer Hon. Ed:

Before you opening this letter going to door of your office and closing it and locking it. Next running quick-like to window and closing it and locking it. Now turning off intercom. Taking quick peek under desk to making surely nobodys there. Nobody? Okey, now if you sertanly nobody looking over Hon. Sholder, then you can opening letter.

This are sooper-seecrit hush-hush information, Hon. Ed. Yes indeedy. If rong peeples getting this news, we might be having internashunal sityouayshun. After you get thru reeding this letter, better burning it. After you burning it, better scattering ashes all over office floor. Knowing your Hon. Office floor this not making much difference in appeerance anyhow.

All set? Sitting down you are? Okey, now heer this. Right at this very moment there are an Erth Saddlelite circling our erth. A reel honest-to-goodness erth saddlelite going round and round and round. But who belonging to it? Who putting it there? Aha!! That are eleventeen thousand bux questshun.

Howsumever, I figyouring that if anybuddies are able to finding out answer, it are you, Hon. Ed. That are why I are intrusting such valyouable dope to you. Scratchi knowing you can getting to bottoms of things reel fastlike.

Of course, Scratchi could doing same likewise, only I are having little trubble. Peeple out here thinking I crazy!! Can you imagining —peeples trying to tell me it are a power leek!! A power leek! If there are one thing I knowing, it are what power leek sounding like.

Just happening to thinking I not telling you howcomes I knowing there are erth saddlelite way up in Hon. Heavyslab Layer. Well, cupple days ago are sitting in shack, not doing anything, just pushing crooked things strate and strate things crooked, when desiding to toon across band before Hon. Brother Itchi are calling me to dinner.

Reseever are hardly getting hot before heering very pecoolyar signal, kinda rough but varying like having modulayshun of some sort on it. Being curryous, are turning rotery beem to seeing what direckshun signal coming from.

Hokendoke!! Signal are coming from everywhere!! No matters where turning beem, signal still coming in like million bux!!

Just then signal fading out. So, I making note of freakwency, and going to dinner. Next day are working like furies, and getting rotery beem so it not only turning, but also tilting up and down. A little old signal like that not fooling old geenyus Scratchi, no indeedy!!

Rite after finishing work on beem, are starting to listening for signal. I listen and listen, but are not until almost dark that I finely heering it. It not staying on very long, but long enuf that I finding that signal are coming in best when beem are pointed strate up in air. What further proof are gentlefellow like me needing? Certainly are not getting signals from moon, or Hon. Mars!!

So there you are, Hon. Ed. A reel 1/c erth saddlelite are circling our globe. See what you can doing about finding out. . . . Excoose please, Hon. Tellyfone are ringing.

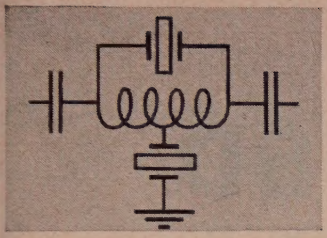
That were the Hon. Power Company. It seeming that they calling to telling me that they finding power leek I complaneing about. Down the road a little was from Hon. Brother Itchi's ranch are neon sine that are having bad leekage for few minutes after being turned on each nite. They say it all fixed.

So, no erth saddlelite. Of all the . . . I could have sworn that . . . why didn't I . . . Hon. Ed. you know, it are kinda funny. You know where neon sine being. It rite outside restaurant called The Saddle. So, it reely were a Saddle Lite.

Respectively yours,
Hashafisti Scratchi

"Why don't you Ham for a while Honey?"

← For further information, check number 28 on page 130.



From this exclusive HIGH FREQUENCY filter originates the cleanest signal on the air!

Hallicrafters new HT-32 transmitter features 5.0 mc. quartz crystal filter... new bridged-tee modulator... high stability... gear-driven V.F.O.

• Forget your old ideas about SSB signal clarity! The HT-32 establishes *entirely new standards* with two major achievements of the world famous Hallicrafters laboratories—yours exclusively in the HT-32:

1. **5.0 mc. quartz crystal filter.** Result of a 3-year research program, the crystal filter system now is commercially practical at *high frequencies*. System cuts unwanted sideband 50 db. or more!
2. **New bridged-tee modulator.** Temperature stabilized and compensated network provides carrier suppression *in excess of* 50-db. Patented diode application develops sideband energy from audio voltage. World's most stable modulator.

These and many other features make your decision *clear*—compare the HT-32 with any other transmitter available. Your supplier has all the details. Stop by and see him today.

ADDITIONAL FACTS ABOUT THE HT-32

- SSB, AM or CW output on 80, 40, 20, 15, 11-10 meter bands.
- High-stability, gear-driven V.F.O.
- 144 watts peak power input.
- Distortion products down 30 db or more.
- Complete band switching.
- C.T.O. direct reading in kilocycles.
- T.V.I. suppressed.

NEW
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For further information, check number 24 on page 130.

EDITORAL
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

The Story Behind Yasme

There is hardly one of us who hasn't imagined ourselves on a small boat cruising the beautiful South Pacific without a worry about when we had to be where. Somehow it has always sounded like the last word in freedom and serenity. If you have been following the Yasme series in CQ you will have put that dream away with your Santa Claus and Easter Bunny. The principal characters in this epic have been the 40′ sloop Yasme and Danny Weil, the skipper. Danny's dream was a lot bigger than just sailing the South Pacific. He wanted to make his mark in the world, to go down in history as having accomplished something difficult and unusual. His plan was to be the first Englishman to sail around the world alone. And for this dream he was willing to sacrifice everything. Perhaps you'd be interested to hear how this got started.

Danny Weil lived with his mother in the outskirts of London and worked every day, six days a week, in his small watch repair shop, getting deeper and deeper into the rut of life. Then one day he separated himself from all the rest of us by making a decision. Sounds simple doesn't it? That's all it really takes to change anything: a decision. He spent two years finding the proper boat, rebuilding and outfitting it for his goal, and getting things in order for his departure.

Early in 1955 he set sail from Poole, England on the first step of his voyage. To North Africa, the Azores, and then across the stormy Atlantic to St. Thomas in the Virgin Islands.

His little homemade ham transmitter, more for emergency than regular ham communications, had fizzled out so Danny sought out Dick Spenceley, KV4AA, to see if he could get it back in working order.

Dick was glad to help, but as the story of Danny's trip unfolded he began to see some possibilities that Danny hadn't considered. As long as Danny was going around the world why not take along a good set of ham gear and make a super DX'pedition out of it? He then could stop off at those many small islands which were so badly needed by the DX'ers and furnish contacts to everyone who needed them.

This sounded like a good idea, but it brought up the problem of how to finance the trip. The original plan was to stop at only the larger ports so that he could set up shop for a month or two as a watchmaker and earn enough for gas and food to the next port. But any port big enough to pay a watchmaker for visiting already had plenty of ham radio, and too, if he spent his time working he wouldn't be able to get on the air much.

CQ and Yasme

After reviewing the expenses involved Dick called me and explained the whole plan. He thought that if CQ were willing to buy a series of articles by Danny, that between that and donations from DX'ers it could be kept going. I agreed to go along with him on the gamble. I could just see the short boring travelogues coming in from here and there for us to publish. Ugh. You know . . . "sailed from so-and-so on May 20th, arrived so-and-so May 30th, found shack, set up equipment, made 2500 contacts, 73."

There followed the most exciting series of stories to ever appear in a radio journal and one of the most popular features in CQ. We paid top dollar for them . . . but gas was darned expensive, the sails were getting worn to a frazzle and the donations from DX'ers were dwindling. It was decided at this time to go to the dollar-per-QSL system of financing. Thus once you contacted Danny you had the choice of sending a dollar and getting a QSL immediately by air mail or else waiting for him to get through and take care of you by Bureau.

This succeeded and enough money was finally saved to send a completely new set of dacron sails plus an extra mainsail and jib when he almost got sunk coming into Port Moresby and lost the others overboard (see March '57 CQ).

Danny's DX'pedition was something that has never been seen before in ham radio. He was usually on the air 12-14 hours a day and worked five to six thousand stations from almost every spot he landed: Tahiti, Nauru,

What's New With The Electron...1957

Eimac unveils new ceramic tubes at 1957 I.R.E. Show in New York City

One of the highlights on last month's I.R.E. Show was Eimac's display of tubes that can take it... they range from a giant klystron, taller than any man, to receiving tubes barely larger than grapes...

tetrode prize package

Among the Eimac tubes on display was the new Eimac ceramic 4CX5000A... a ceramic and metal all-purpose forced air-cooled tetrode, only 4½ by 9 inches in size... it delivers 16 kw of Class B audio power... is highly recommended for CLASS AB_1 SSB where its output is a conservative 10 kw...

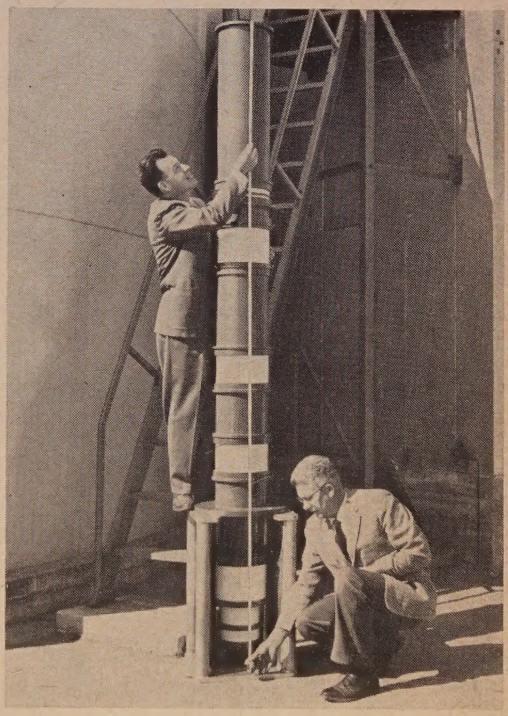
Eimac turns on heat

Further proving the claim that Eimac tubes can take it was the display featuring a small transmitting tube overloaded to more than three times its normal rated input... this is the 4CX300A, a ceramic prize package that has almost incredible ratings up to 500mc... two 4CX300A's will take a kilowatt in SSB... another tube featured was the 4X250B... with a ceramic plate-grid seal... a tube useful for amateur application in all services...

the long fellows

Serious-minded engineers looked over the display of new ceramic klystrons... some designed for industrial application... powers range from a few watts to a megawatt in UHF/microwave service.

Interested persons may obtain a copy of "What's New With The Electron... 1957" by writing our Amateur Service Bureau.



Bill Eitel, W6UF, and Jack McCullough, W6CHE, measure the world's largest electron tube, the Eimac X626 UHF klystron, which delivers 1,250,000 watts peak power and 100,000 watts average power.

EITEL-McCULLOUGH, INC.
SAN BRUNO · CALIFORNIA
Eimac First with Ceramic Tubes that can take it

Eimac

For further information, check number 16 on page 130.

Canton, Guadalcanal, Port Moresby. Certainly no DX minded amateur lacks any of those countries today. Even I managed to work him at almost every stop with either my DX-100 on c.w. or the Phasemaster II on SSB and the trusty folded dipole antenna.

Radio Gear

Much of the radio equipment on the Yasme was donated to the expedition as a service to ham radio by the manufacturers. The participating manufacturers are to be commended for they get dozens of requests for free equipment every day and it is often pretty hard to tell when a really legitimate need is at hand. All of us thank Art Collins for sending the 75A4, which made it so a lot of us weaker signals could get through and particularly helped the SSB gang. Elmac sent an AF-67 which was responsible for thousands of the contacts. Later in the trip we began to get the benefit of the Eldico SSB-100 as Danny became familiar with it.

Then came catastrophe, as you will read in exciting detail elsewhere in this issue. Suddenly Danny was left without anything but a torn pair of shorts and his life. Gone was the Yasme and all that radio equipment . . . torn to shreds on an uncharted reef off Papua. Gone was a $50,000 investment. Danny had nothing left in the world.

The Red Cross flew him to Australia and the VK gang put together enough to get him back to the States. Danny is only interested in one thing today: getting another ship and continuing his trip. All he has to sell is his story, which is a hair raiser. He has been visiting ham clubs throughout California and getting on as many television shows as possible. He needs about $12,000 to buy a used boat of the type that could do the job, and that is what he is trying for.

By the time this is in print he will have arrived on the east coast. If any radio clubs in the area are interested in an exciting evening they can drop a note to him via CQ (300 West 43rd St. N.Y. 36). If any of you have any contacts for helping him get on TV or know any manufacturers who might be interested in some sort of mutual aid proposition (he will tow watches around the world underwater, give paint, fiberglass, sails, etc., the test of tests) please get in touch with me or Danny.

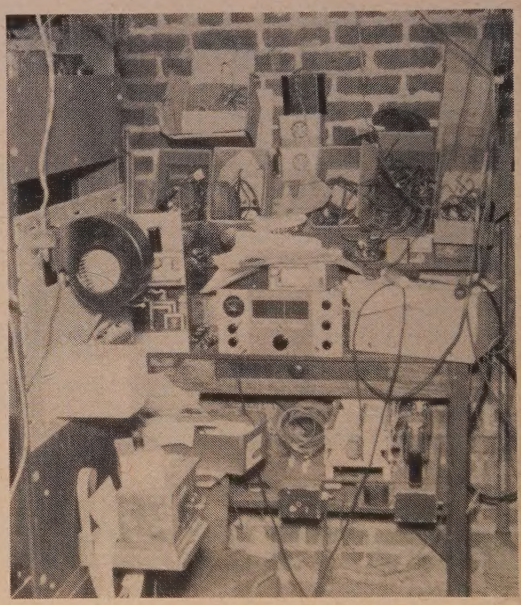
If you or your club would like to help Danny get Yasme II you can send cash, check or money order made out to "Danny" c/o CQ. Let's get him back to sea again so he can visit more of those islands we need to contact. Let's help him fulfill his dream of circling the globe alone.

3-9-19-33-51-?, Wayne

Letters . . . to the editor

Dear Wayne:
You did a good write up job showing the ARRL QST Hqs. Why don't you devote an article to the CQ Hqs? I am sure that many like myself would like to see what the people look like and just how you put a magazine together each month. How is it done? I think it would be interesting.

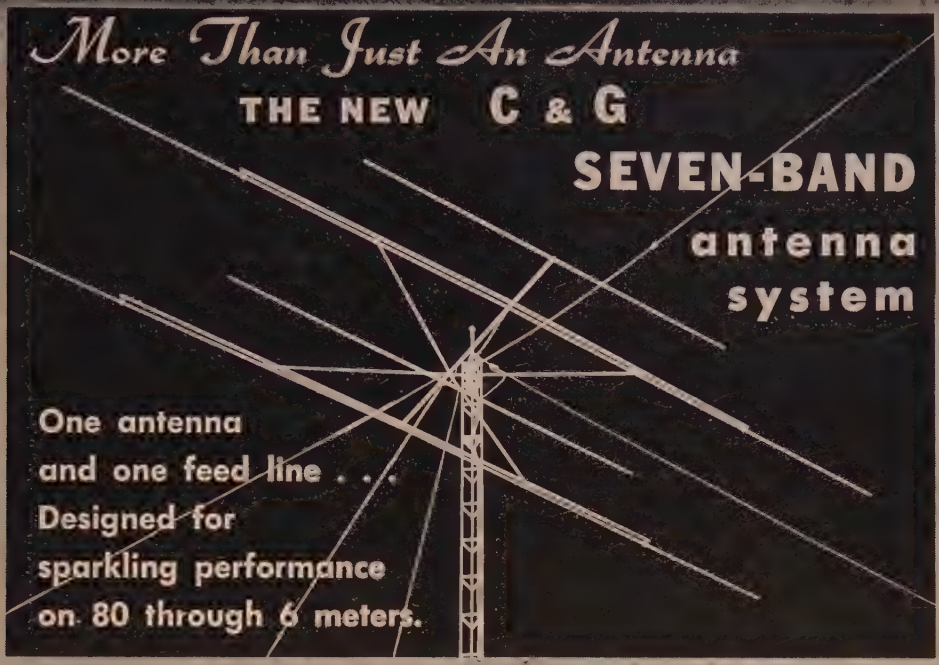
Ed Marriner, W6BLZ
La Jolla, California



As soon as I get one of my cameras back from Jim Morisset K2OLK (Frozen Jim) or Jean Shepherd (traveling Europe for CQ) K2ORS I will get busy and see if we can't do just that. Don't expect anything like the ARRL HQ though for we are a two man outfit tucked into a small office beating the wolf away from the door monthly with a second hand wouf-hong. As a teaser for the article I will show you a snapshot of the CQ Lab where we conduct exhaustive technical evaluations of equipment for our technical reports. Ahem.

High Power on Six Meters

Dear Wayne,
I have been asked many times on six meters how it is possible for me to run 500 W input and not have TVI. I believe if the antenna is fed with Co-ax cable and carefully matched to bring the SWR down as low as possible, it goes a long way to reduce TVI. Of course good construction and shielding of the transmitter is a must. In my case the transmitter runs 500 W input to a pair of 4E27's modulated by a pair of 811A's. Output is 300 to 350 W from a variable link to RG8/U Co-ax. A SWR-Bridge is at all times in the line.
The antenna is a 4 over 4 array spaced 5/8 wavelength apart and mounted 37 ft. above a 5 story building. My own TV-antenna is mounted on the same mast 10 ft. below the bottom bay. The TV-set has a HP-filter on it and it is clean on all channels. Up to now 4 cases of TVI have been reported to me and on investigation were found to be due to front end overloading. The people were advised to put a HP-filter on their sets and all complied after the nature of TVI was explained to them. Also I told them that I would not go off the air for any reason other than an order from the FCC.



Model 200 mounted on tower and rotator with 80 and 40 meter radials.

The new C & G Seven-band antenna System is ideal for those with limited space who want optimum coverage on 80 through 6 meters. All Systems are pre-tuned and color-coded to simplify installation. Assembly is simple and fast. A standard heavy-duty TV rotor operates the beam. Because of the very low standing wave ratio and single coaxial feed line, the TVI problem is greatly reduced on every band. The specification chart below shows that here is a complete antenna system to give the radio amateur maximum performance at minimum cost.

ELECTRICAL SPECIFICATIONS AND CHARACTERISTICS CHART

	6 Meters	10 Meters	11 Meters	15 Meters	20 Meters	40 Meters	80 Meters
Model 100 Amateur Net...$ 99.95							
FORWARD GAIN	4.7db	7.6db	6.7db	5.9db	0 db	(c) 1.5db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	26db	21db	17db	(a)	(a)	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.5	1.1-1.6	1.1-1.3	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	2	3	3	2	1	1	(b)
HORIZONTAL BEAM ANGLE	22 deg.	30 deg.	34 deg.	37 deg.	(a)	(a)	(b)
Model 200 Amateur Net...$ 149.95							
FORWARD GAIN	4.7db	7.6db	6.7db	5.9db	5.6db	(c) 1.5db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	26db	21db	17db	14db	(a)	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.5	1.1-1.6	1.1-1.6	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	2	3	3	2	2	1	(b)
HORIZONTAL BEAM ANGLE	22 deg.	30 deg.	34 deg.	37 deg.	39 deg.	(a)	(b)
Model 300 Amateur Net...$ 199.95							
FORWARD GAIN	5.2db	8.8db	7.9db	7.8db	7.6db	(c) 2.6db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	29db	26db	23db	21db	9db	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.7	1.1-1.6	1.1-1.6	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	3	4	4	3	3	2	(b)
HORIZONTAL BEAM ANGLE	22 deg.	22 deg.	26 deg.	30 deg.	32 deg.	39 deg.	(b)

Footnotes; (a) Standard figure 8 dipole pattern rotary
(b) Vertical cone radiator with top loading
(c) With radial guy wires

Order direct from C & G or your local distributor. Write for complete specifications.

C & G RADIO SUPPLY CO
2502 JEFFERSON
TACOMA 2, WASH.
Phone
BR 3181

For further information, check number 44 on page 130.

I just received a Tapetone converter on loan from Tapetone Inc., until my converter on special order is finished. The workmanship and construction of the converter is excellent. Also has very good gain and very high image rejection. I'll let you know more about the converter after I had it a few days and made some tests with it.

Hope to see you soon on Six.

Frank H. Bremer, K2KRC
Brooklyn, N.Y.

Beer Can Verticals

Hello Wayne,

Been hearing a lot about these "beer-can" verticals that the boys are using. Being enterprising young college men and keeping in mind the true spirit of ham radio, we are prepared to make an offer to any fellow hams who might be interested in a good proposition and at the same time add to their hamming pleasure.

Anyone who has tried to build one of these "beer-can" verticals knows the problems involved in obtaining these precious empty cans, and that's where we come in. As a public service and still keeping the ham spirit in mind we are willing to empty any and all full beer cans which are shipped to us at the above address and return them immediately freight collect. We certainly hope that a lot of the boys take us up on our offer because we're awfully thirsty.

Yours for bigger and taller verticals . . . hic . . . 73/es Gud Luk

The Oxford A.R.C.
Joel, K8AEJ/8
Mark, W8RKK/8
Bob, K8AAY/8
Joe, Kn8DMZ/8
Miami University
Oxford, Ohio

Help Wanted

Dear Wayne,

Look out! I'm after dollar bills and perhaps you can help. Here's the scoop . . . HA2MC has escaped from Hungary with his family into Austria. Things are plain lousy for him now. He can't get on the air, of course. One buck to CARE will send him 20 pounds of grub, which should help. Send one dollar to CARE, New York City, New York and mark it: Food Package For Miklos Porkolab. XX Stromstrasse 34, Vienna, Austria.

Charlie Witty, W2BFN

New Hams

Gentlemen:

Here is a picture of the four Koeller brothers, members of the Platteville Amateur Radio Club, who just

got their tickets. From left to right are David, Ernest, Monsel and Duane, KN9GDL, GDN, GDO, and GDM.

Bruce Smih, K9CKW
Platteville, Wisconsin

Product Detector

Dear Sirs:

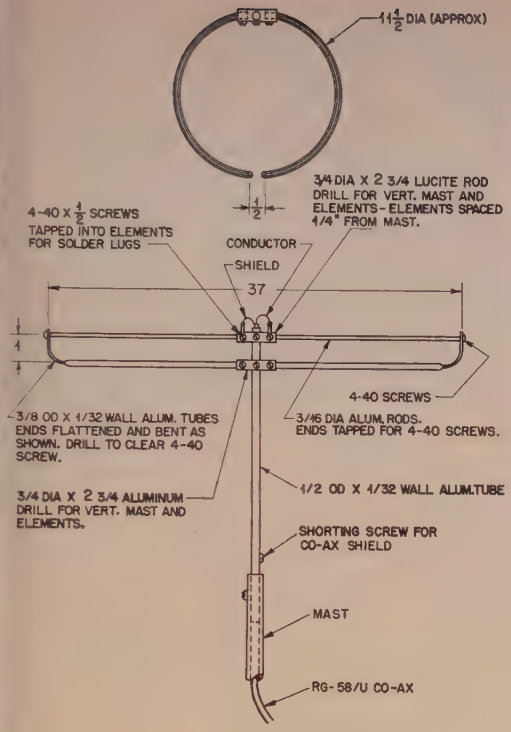
Made the Product Detector as described in the Nov. 1956 issue for use in a HRO-60. It did not work satisfactorily at all until I lifted the ground connection from the ground section of S-7 so that I have AVC in the CW position. This seems to be contrary to what should be correct but it works fine that way.

However, the noise limiter is no longer operative and it is badly needed here at this location. Is this trouble

(Continued on page 111)

Nathaniel Bishop, W1EYM
4375 Congress St.
Fairfield, Conn.

2 Meter Halo



Shown are some reasonably self-explanatory sketches of the horizontal halo that I use on my 1956 Ford Station Wagon, in conjunction with my "home brew" 2-meter mobile equipment.

This antenna is mounted so that the halo is 19" above the top of the roof level of the Station Wagon. The pipe support is spring-mounted to the bumper on a conventional antenna support.

In general, the only adjustment required is the spacing adjustment between the tips of the antenna. This is adjusted to give the minimum standing wave ratio at the desired operating frequency, but an entirely acceptable standing wave ratio for mobile operation is provided over approximately a 3 megacycle range. No special precautions are taken to provide for high Q in the elevator section indicated in the top 16" of the supporting pipe, as high Q is not necessary in this elevator when feeding a 52 ohm load with a 52 ohm line.

This obviously is not the only way to design an effective 2-meter halo antenna, but it has proved itself to be an extremely practical one in all cases of weather, icing, etc. The fact that the ends of the antenna do not have a large fixed capacity between them helps the situation on bandwidth, and certainly helps the situation if obstructions find their way into the halo while the car is underway. They have some place to go without wrecking the antenna. The fact that the low capacity between the tips is provided without insulated spacers is desirable in order to avoid detuning under varying weather conditions. ■

Close up of construction detail

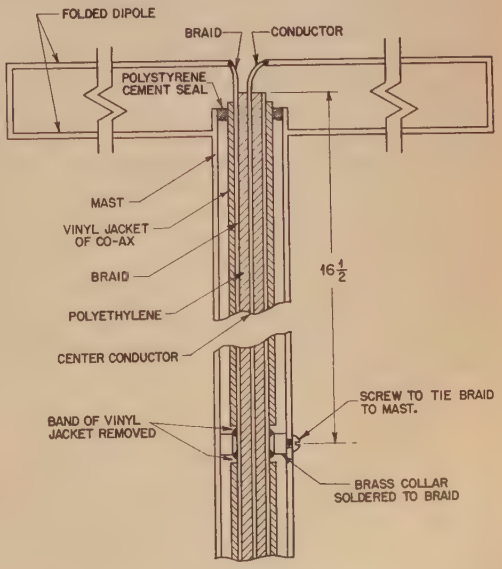


Fig. 1—Front view of Novice transmitter showing home-made etched aluminum front panel. Frequency is readily changed by replacing crystal in the upper left hand corner. Antenna output jack and tuning indicator light appear in upper right hand corner. Lower panel identifications from left to right are key jack, amplifier plate tuning knob, antenna loading knob and power cord.

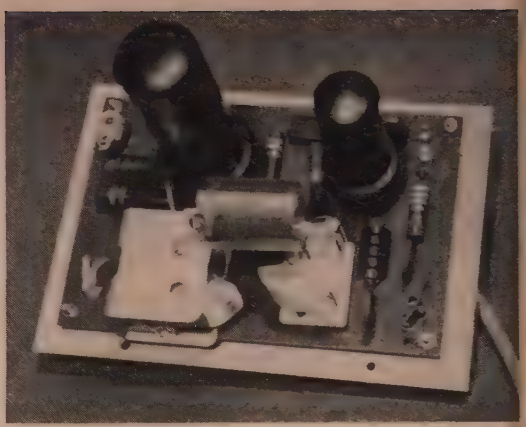


Fig. 3—Rear view of etched circuit board. Conventional chassis is eliminated by mounting all components on the 1/16 inch thick laminated phenolic sheet which carries the foil wiring pattern on its opposite side. Condenser shafts extend through both wiring board and front panel.

E. L. Klein, W4UHN
5902 Brunswick St.
Springfield, Virginia

Novice Transmitter

Using Printed Circuit Techniques

Are you planning to build your first transmitter? Do you need a small portable rig? Would you like to brush up your c.w. on low power? If so, why not try printed circuits?

Before discounting this new construction method or relegating it to the sanctum of the elite laboratories, let us first investigate the ease with which it may be employed, and recognize the attendant conveniences afforded by currently available kits of printed circuit materials.

As will be seen in the accompanying photographs, no chassis is used in the Novice transmitter. Instead, a simple sub-panel, upon which all components are mounted, is used in conjunction with a front panel. These are both easily made using the supplies furnished in kit form by several companies. All parts, including sockets, resistors, capacitors and coils, are standard items available locally.

Circuit

Conventional circuitry is used in the Novice printed circuit transmitter. The modified Pierce crystal oscillator, as seen in *fig 2*, employs a 6AG7 tube because of its superior screening which minimizes changes in frequency when tuning or loading the subsequent amplifier stage. Excitation in the crystal oscillator is controlled by the 100 mmfd screen condenser connected between terminal 6 of the 6AG7 tube and ground. Sufficient drive to the 6L6 amplifier stage is obtained even though the untuned radio frequency choke, RFC, is used in place of an oscillator plate tuned circuit.

A pi-network was chosen for the 6L6 amplifier output circuit because of its simple construction and ability to feed a variety of antenna lengths. Tuning to resonance is accomplished by C1 and indicated by a dip in brilliance of the No. 44 pilot light, I1. As is usual with pi networks, loading is increased by advancing C2 while maintaining resonance with C1.

Cathode keying of both the oscillator and amplifier stages is done by tying their cathodes together at the RCA type phono jack, J_2.

All fixed condensers are rated at 500 volts and may be either disc ceramic or mica type. Spacing of the resistor mounting holes in the circuit board is such that ½ to 2 watt carbon resistors may be used, depending upon what may be available to the constructor. When

This is the first in a new series of "how-to-do-it" articles describing practical applications to which the etched circuit board type of printed circuits may be put. A low power c-w transmitter is a logical starting point as a follow-up on Mr. Klein's previous "methods and materials" articles which first introduced printed circuits to the amateur thru the pages of CQ. (February, March, April, September and November 1956)

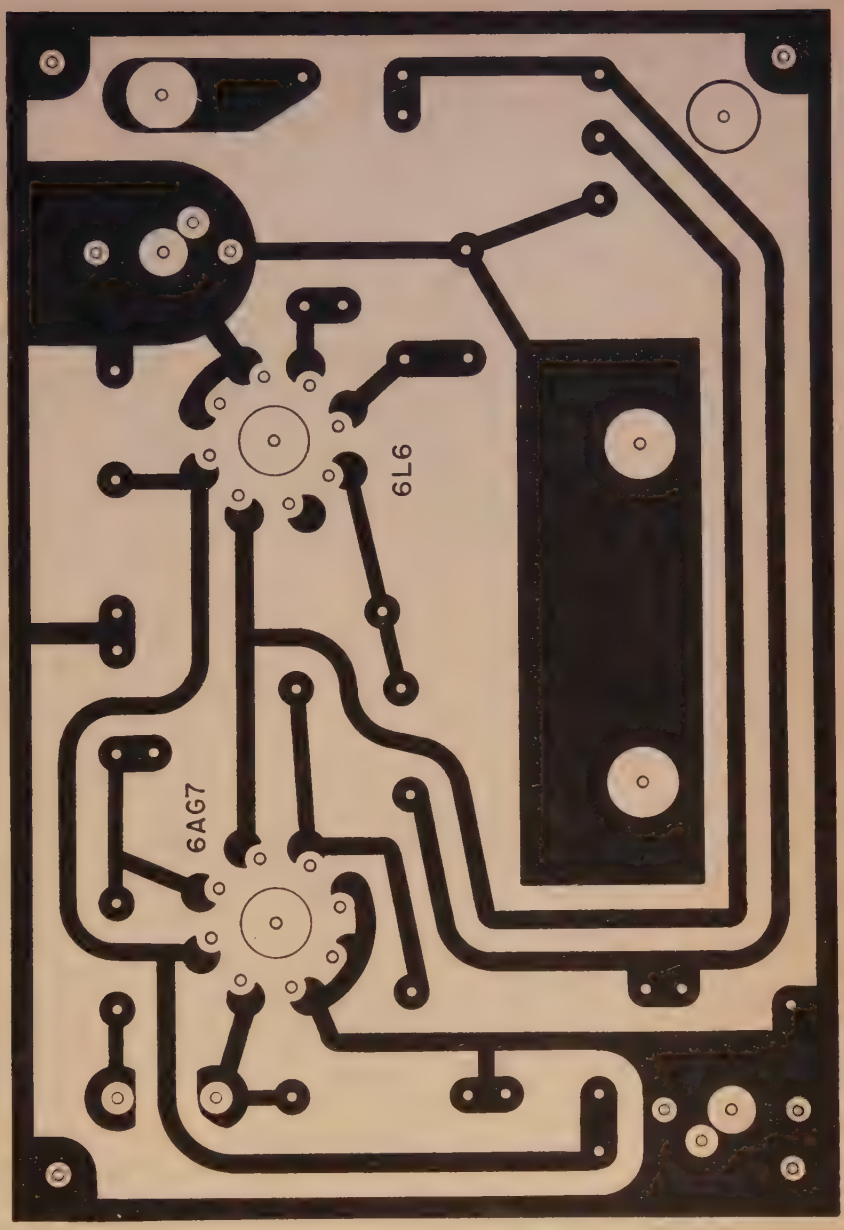


Fig. 4—Master drawing for etched circuit board used in Novice transmitter. The critical dimension, 6¼", is included as a guide if a photographic negative is made.

buying new parts, ½ watt resistors should be selected for the grid circuits and 1 or 2 watt units selected as screen dropping resistors.

Coils

Tank coil, L1 is made from *Barker-Williamson Miniductor* stock, type 3016. This 1 inch diameter coil stock, which has 32 turns per inch, is cut in half to provide 48 turns. A ¼ inch by ⅜ inch piece of polystyrene, 2¼ inches long, is cemented to the coil and in turn bolted to the frame of C_2 with a ½ inch long #6-32 machine screw as shown in Figure 3.

It is desirable in printed circuit work, to conserve space by using r-f choke coils which do not have the large cast lead ends. The 100 milliampere *National* R-50 chokes perform well in this application.

Circuit Board

One of the principal features of this article is the full scale reproduction of the circuit board pattern in *fig 4*. If it is desired to utilize

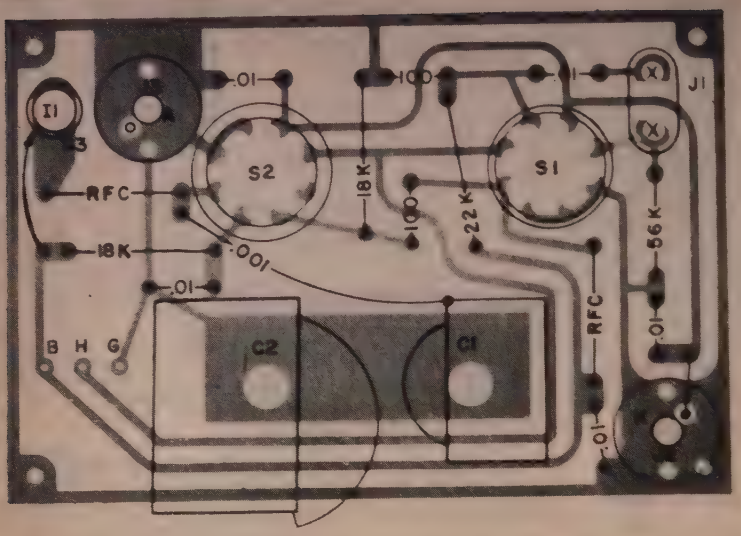


Fig. 5—Front view of etched circuit board showing placement of components. Shaded areas represent conductive copper foil on the opposite side. L_1 (not shown) is mounted on C_1 and C_2.

a hand-cut mechanical negative, the red ruby cutting film which comes in some kits, can be placed directly over the page and the outlines of each conductor cut out with a sharp instrument. As an alternative method, a photographic negative can be made from this master drawing. The latter, of course, will give better accuracy and will eliminate considerable close hand-work. Having obtained a negative by either of these methods, photoengraving of the copper foil-clad phenolic panel may proceed as outlined in previous literature or in accordance with the manufacturers instructions.

Front Panel

Like the etched circuit board, the front panel may also be made by the photoengraving method. In this case, a negative is again produced, this time using *fig 6* for the master drawing. Solid metal material, such as a part of an aluminum chassis cover plate, is preferred for this application. Presensitized zinc or aluminum plates may also be obtained from a printing supply house, or a photosensitive coating may be applied by the amateur constructor. After exposure and development of the "resist," the panel may be dyed to accentuate the pattern and then coated with a protective acrylic spray. An alternate method, which may be used to make the panel, requires a deep etch of the unprotected areas. These areas are then filled with black enamel and the raised areas polished bright.

Assembly

After etching away the unwanted copper foil and washing the circuit board to remove all traces of the ferric-chloride etchant, various sized holes are drilled to accommodate the tube sockets and other components. It will

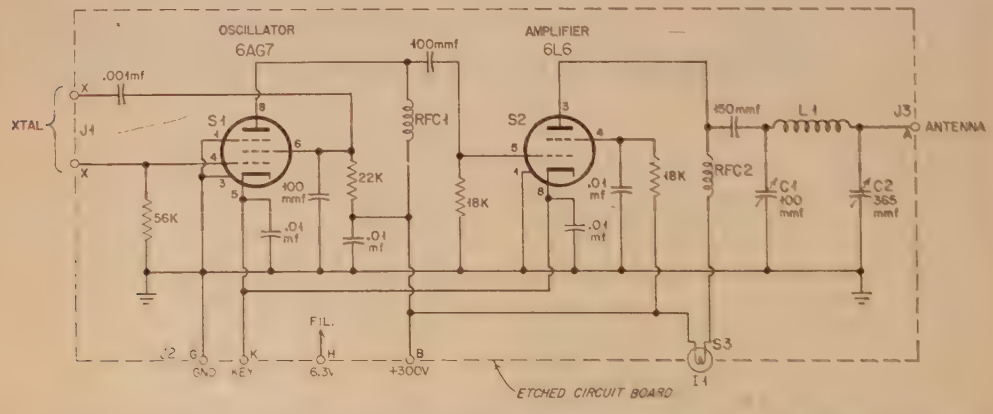


Fig. 2—Circuit diagram of the Novice transmitter. External connections to the etched circuit board are shown along the dotted line.

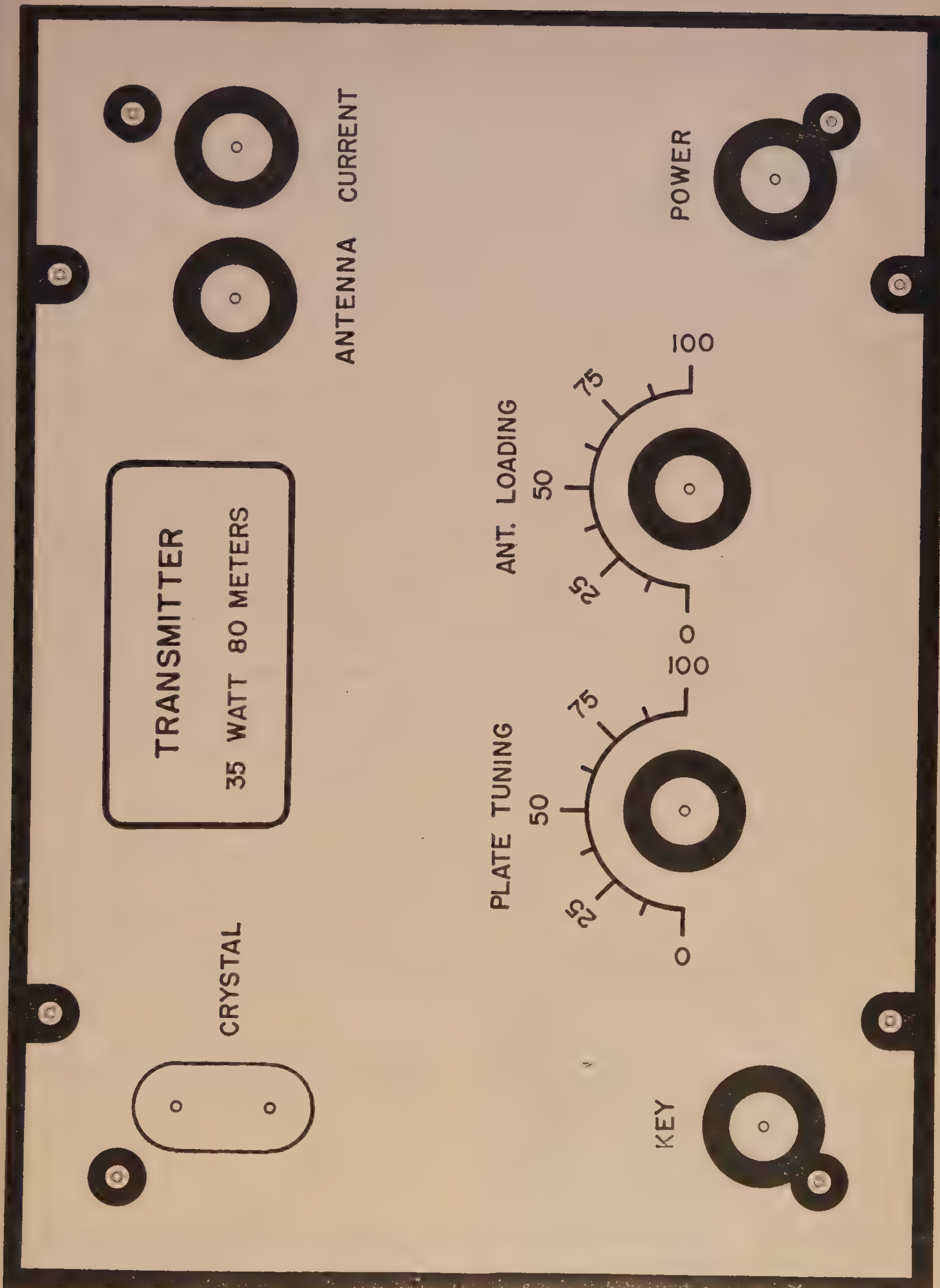


Fig. 6—Front panel may be produced by the photo-engraving process using this master drawing. Call letters or signature may be added with black ink prior to photographing.

be found that the small pilot circles, which are in evidence in *fig 4*, aid immeasurably in locating accurate hole positions.

Immediately before assembling and soldering, the panel is thoroughly scrubbed with an abrasive household cleanser or steel wool to remove the photographic "resist" and any residual surface oxide.

No difficulty should be encountered in mounting the components, all of which are soldered in place as shown on *fig 3* and *5*, except the crystal socket and two variable condensers. The crystal socket, J_1, is secured to the etched wiring board with a ¾ inch long #4-40 screw, and short lengths of bare hook-up wire are used to complete connection of its terminals through the wiring board. Plate tuning condenser C_1, is mounted with standard shaft nuts, and loading condenser, C_2, is secured to the wiring with two #6-32 screws which are positioned to suit the condenser frame and the etched wiring on the circuit board.

Needless to say, only a rosin core solder may be used. Denatured alcohol or carbon-tetrachloride is then used to dissolve the remaining rosin and the finished circuit board is coated with an acrylic spray for continued protection. *Fig 7* shows the conductor side of the etched circuit board after all parts have been soldered in place and before the panel is bolted to the front panel by means of ¾ inch long #6-32 screws and ½ inch spacers. Entrance of the power cord and its connection to the circuit board are shown in detail in *fig 8*.

Cabinet

Inasmuch as the front panel is 5 inches by 7 inches, it follows that a standard 5 by 7 inch aluminum chassis might be a logical starting point in construction of a cabinet for the novice transmitter. In this instance, a 2 inch deep chassis was chosen and was cut around its periphery to form two halves. Referring to *fig 1*, it will be seen that the chassis top serves as the cabinet back and the chassis bottom forms a front frame. Perforated aluminum approximately 24 inches by 5 inches, is then bent around and fastened within the chassis frame with sheet metal screws to complete the cabinet.

Deviations in cabinet design which permit adaptation of materials and construction methods most available to the individual constructor will become evident as work proceeds.

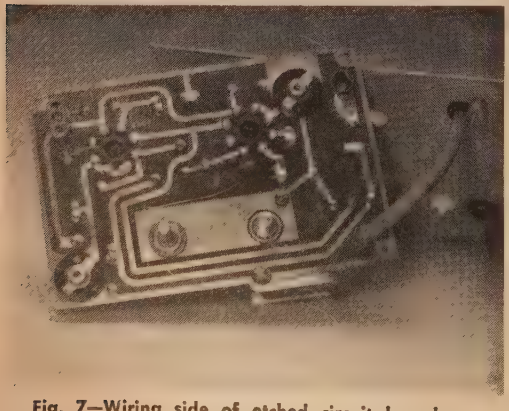


Fig. 7—Wiring side of etched circuit board reveals additional components including key and antenna jacks at opposite corners of the board as well as crystal socket at upper left. Note how tube socket terminals are bent over and soldered in place.

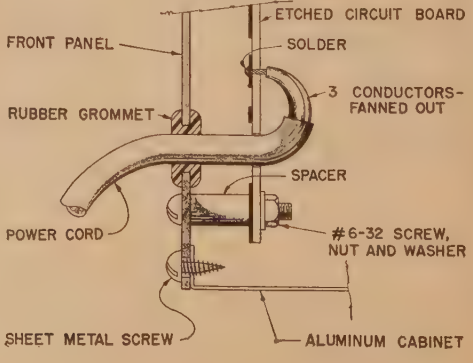
Operation

An external power supply capable of supplying 300 volts at 120 milliamperes, and 6.3 volts at 2 amperes is needed for the Novice transmitter. Such a power supply may conceivably be constructed within the same cabinet as the transmitter, if suitable size adjustments are made.

Initial tests are made with the 6L6 amplifier tube removed from its socket. Activity and frequency of the crystals are thus verified. After inserting the 6L6 and closing the key, the plate is tuned to resonance as indicated by the plate current indicator lamp. A good ground connected to the front panel and an antenna approximately one quarter wavelength (65 feet) long plugged into the antenna jack complete the installation.

Operational tests on several models have shown that adequate heat dissipation is provided, and that good television interference shielding is achieved. An all-around good performing set, and one any amateur constructor would be proud to display, the printed circuit Novice transmitter is worthy of serious consideration, whether the amateur is just getting started or investigating the advanced construction techniques of printed circuits. ■

Fig. 8—Section thru lower right hand corner of assembled transmitter showing method of supporting etched circuit board and attachment of power cord to it.



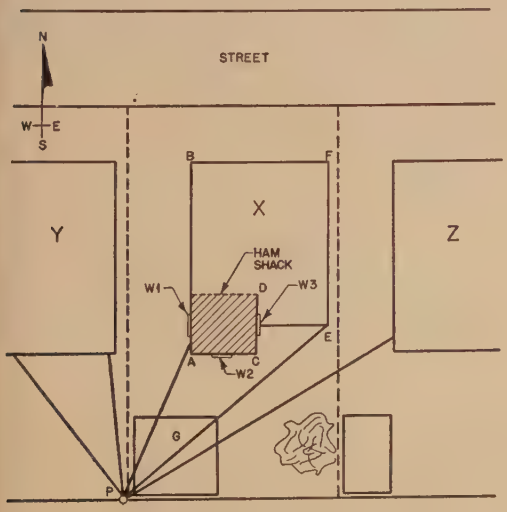
A Makeshift Antenna

Eric J. Young, W8RLE
13504 Chapelside Ave.
Cleveland 20, Ohio

The "Gutter" antenna, described here, is not intended to be a substitute for any of the standard types of antenna in common use. This article is intended to show that it is possible to get "on the air" under restricting conditions which make the installation of a conventional antenna impossible.

A sketch of the area in which I occupy the upper floor of house "X" is shown. "G" is the 2-car garage, "Y" and "Z" are adjacent houses, and "P" is a utility pole (complete with transformer). There are eleven power and telephone lines from the utility pole to the three houses X, Y, and Z. My landlord, who occupies the ground floor apartment, will not permit me to drill holes in the walls, and will not agree to my installing an antenna on the roof.

Apart from the limitations imposed by the landlord's restrictions and the physical hazards presented by the power and telephone lines, my shack is ideally situated for "hamming" purposes. My problem was simply one of how to get signals into the atmosphere with some prospect of making QSO's beyond the city limits. A couple of years ago I was able to overcome a similar difficulty by using a spring clip and hooking my transmitter to the aluminum siding of the house. The present house has wooden siding!



The Author's QTH

I tried using a long wire around the inside walls of the shack, and was able to make a few contacts. When I took down the screens last fall and was preparing to install the storm windows, it occurred to me that a thin wire attached to the gutter by a small spring clip would not be easily visible from below, and the wire could be brought into the shack through the narrow space between frame and window. I made connections to the gutter A-B through window W_1, and to gutter C-D through window W_2. Using a section of the original indoor antenna and varying the combination of A-B and C-D permitted me to use all the ham bands with fairly good results by adjusting my antenna tuner.

Not long ago I had to unhook my leads when I noted that my landlord was about to paint the outside of the house. When he had finished the job, I took the opportunity of his temporary absence to borrow his ladder and clipped a length of thin wire from gutter A-B to gutter C-D at A and C. I then made my connection to A-B again but did not reconnect to C-D.

I stayed up late one night shortly after making this new hook-up, and was very pleasantly surprised to get an RST 5-8-9 from KH6PM in the Hawaiian Islands. A little later I had a good QSO with VK4SD in Brisbane, and the following afternoon worked F3ZD in France. I do not doubt that a 3-element beam, a long wire, or a good doublet would give improved results, but I can at least get my signals out with reasonable hopes of some DX.

At the moment I am figuring on the possibility of clipping another invisible wire from B to F to utilize gutter E-F and gain more length on one leg of the antenna. That may mean unhooking the A-C-D section, with an alternative of taking the transmitter lead through window W_2. Trial and error will show which gets the best results.

So, you fellows who may have been holding off from joining the ranks or are temporarily "off the air" because of antenna difficulties, just hook up a transmitter to some sort of an outside radiator and get cracking. Later on you may be able to improve on that skywire, but in the meantime there is no need to sit back and dream of multiple-element beams so long as there is a gutter to your house. ■

Simple LFO for the Novice

John David, K4HQB
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Bishopville, S. C.

Dear Wayne,

The heart-ripping appeal for more articles expressed in the editorial has touched me. My duty is clear. I humbly admit that I have only recently joined the ranks of Amateur Radio Operators and at the moment could be considered, in all honesty, one of the rankest. Be that as it may, I beg your leave to express an opinion which burns within me.

Why For

The deeper I delve into the mysteries of this fabulous and wonderful thing called Ham Radio, the more I realize the abysmal depths of my own ignorance. True, I have, with the staunch and faithful support of Mr. Bayer, and the Messrs. Chase and Sandborn, not to mention the Standard Oil Company, (who supplied the midnight oil), acquired a limited understanding of that beguiling but insidious thing called Basic Radio Theory. With furrowed brow and clenched teeth I can follow the trail of an elusive little electron through the various stages of one of the simpler superheterodyne circuits. The action and interaction of coupling and by-pass condensers, bias resistors, parallel and series resonant circuits, I can grasp fleetingly in my more inspired and lucid moments. I can follow a diagram with reasonable accuracy, provided there is also a reasonably thorough explanatory text. In construction I am conscientious and meticulous. Every lead must lie neatily in its foreordained position, and every condenser, choke, resistor etc., must be placed carefully and comfortably, its mysterious duties to perform. I have a sincere and honest desire to learn, and a genuine and devoted affection for my shop bench, where I spend many pleasant hours putting things together and increasing the bandspread of my peptic ulcer. I consider the Construction Kit to be the greatest invention since the little switch that turns off TV commercials. We now come to Part Two, entitled:

Minor Complaints . . .
Both Incidental and Vigorous

It is my conviction that for every professional amateur who can, with pen, paper, and slide rule, and before breakfast, whip up an all band-switching, fourteen tube 500 watt transmitter, complete with differential keying and SSB provision, there are literally hundreds of us (we?) struggling neophytes who, instead of graphs, charts, and page-long formulae dealing with integral calculus and sundry trigonometrical functions, could do with a few more relatively simple, detailed, down-to-earth explanations of a numerically low-syllable category.

We need, at first, to exercise our mental muscles toward perfecting the less complicated process of foot travel before delving into the more abstract formulae of electronic aerodynamics.

We bow humbly and reverently before the superior knowledge of these erudite gentlemen but through our awe there ever remains a flickering spark of the fierce desire to know what the horrible hell it's all about!

From a certain popular publication on the various aspects of amateur electronics, I quote from the chapter on power supplies:
(*QUOTE*) "If the output voltage of a power transformer (plate) is doubled by substituting the bridge circuit for the center tapped rectifier circuit, only half of the rated current car be taken from the transformer without exceeding the normal rating."
Unquote.

Now, even in the dim and nebulous regions of my own inept but determined mind, little neuronic relays click, synaptic connections are completed, minute mental impulses activate certain memory cells, and my cerebral cortex receives a message with an amplitude of about S-6. I get a flash of Ohm's Law, and I relax in the conviction that my mental reflexes have received no permanent damage. A simple statement of clear, concise, electronic logic.

But well enough is not left alone. In said publication is a schematic of a transmitter, with a power supply of the afore-mentioned bridge circuit type, which will deliver 140 milliamperes of plate current from a recom-

mended power transformer, the plate winding of which has a current rating of 120 milliamperes in a standard full-wave, center-tapped rectifier.

So will you please tell your many readers that one half of 120 is no longer 60, but 140?

Either that, or tell me *Where Do Them There Extra Electrons Come From ???*

Was old Euclid laughing up his toga at his gullible disciples when he scribbled his way to glory on ancient Grecian sands?

Was the revered Mr. Ohm merely pulling the electronic legs of his devoted contemporaries?

Someday I hope to look back on inconsequential annoyances such as these with a bemused tolerance toward my youthful struggle for intelligence. I shall speak on equal terms with the Maxwells, the Faradays and the Armstrongs of the day and discuss on equal terms with them the intricacies of triple phase inversion techniques and spectrum analysis.

But as of the moment, I ponder; why Fate, in dealing out my cards of life, has insisted on handing me a royal flush of frustrating paradoxes.

And so, as the western sun sinks slowly over my three element beam, and my neighbors begin their nightly chorus of complaints about my fifteen meter harmonics interrupting their regular evening narcotic of Dragnet and Howdy Doody, we come inevitably to: Part Three, entitled:

Stages of Understanding,
or
Should I Go Ohm To Grammar??

Categorically, the Understanding Of Radio can be reduced to three basic stages. The first stage is representative of the beginning beginner, to whom the two lines symbolizing a fixed capacitor appear as: (a) the shortest distance between two points, and (b) the same as (a) except by the Great Circle route. Thus I give you:

STAGE ONE . . . "Fundamentals Frustration," or, "Boning for Basics."

The second stage is dedicated to those who, like myself, luxuriate in the tantalizing illusion that they are 'Catching On.' Thus we have:

STAGE TWO . . . "Marching with Maxwell," or "What's my Capacity?"

The third group envelopes the sliderule boys, the ones who have, to borrow the phrase, 'Got It Made.' So:

STAGE THREE . . . "Suffering Slipsticks," or "Faraday's a Frolic."

The following is a graphic, if fictitious representation of the reactions and comprehension of Amateur and would be Amateur radio operators in the first category, to, and of, an article on the construction of, shall we say, an L.F.O.?

Let's.

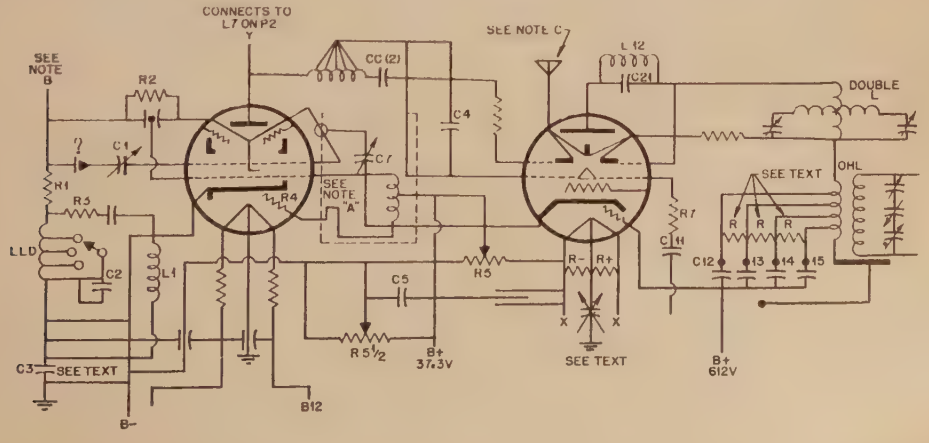
Here is how the article and schematic, not how it was actually written, mind you, but how it might appear to the hopeful but soon to be disillusioned eyes and mind of a neophyte of Stage One:

• • •

PSQ Magazine . . .
"The Amateur's Allah"
. . . August 19—.

The literally countless advantages of a well constructed LFO around the hamshack are so numerous that it is beyond the scope of this article to mention them. Suffice it to say that once you have built this little dandy, you wouldn't part with it for anything. I only regret that it is beyond the scope of this article to tell you the many uses to which it may be put.

The LFO, as originally designed, was described by W-DUD in the March issue of PSQ. I saw, after one flashing glance, that this version left much to be desired in the way of r-f parasitic suppression in the upper 4 kc range of the 11 meter band. So I sat down for a few moments and after a few minor changes in all the components and a complete revision of the circuit, came up with



this much, much better version, a truly universal instrument.

By utilizing one of the new High *pu* Y match multiple diode hextode pentode tubes, I found that the circuit would accept considerable simplification and at the same time increase the potential *mv* gain in direct proportion to the square of the inverse feedback capacity of C7 and the relative RF acceptance capability of G2 in V1 to provide sufficient linear DB gain over a constantly varying background noise level by as much as 7 to 31 times. This variation of course being due to the thermionic differentiation inter-electrode resistive-capacitive ratio of individual tubes. My reason for choosing this tube, the 12PQ7YGT, can easily be understood even by the would be Novice, from the following simple formula:

$$X = \frac{12+P}{O} + \frac{Q+7}{Y\sqrt{\frac{P2 \quad Y2}{\frac{-L \quad 8-P1}{12-1}}}} + \frac{3.2}{\frac{2\ (YG)\ T-1}{2\ pi\ T}}$$

Now, by the very simplest Pythagorean techniques of fifth order quantum mechanics, we proceed to eliminate the S R factor, leaving:

$$X = \frac{12P}{O} + \frac{Q7}{O} + \frac{2(YG)T-1}{\frac{2piT}{3.2}}$$

And since, on the fifth order scale, 2 pi T is always equal to and opposite from 3.2, they cancel, leaving:

X = 12P + Q7 + 2(YG)T–1 or 12PQ7 +1(YG)T and finally 12PQ7YGT!

Could anything be simpler? To be sure not.

Boiled down to the basic components and always keeping in mind the Limited Facilities of the Novice[1] the parts list is kept to minimum of:

17 chokes
147 capacitors
112 resistors
7 variable capacitors (see text)
11 coils (see text) (Then see your banker)
tubes, sockets, chassis, knobs and other assorted hardware.
Note: All parts Values Given on Schematic

Look around through your chassis bin until you find a chassis 7–11/16 by 6–4/9 by 3–4/13. A chassis 8 by 6 by 3 would probably work just as well but we don't want to start out by substituting now, do we?

The parts are laid out on the chassis and it is drilled and punched.

Place all parts according to the photo. C3 through C27 cannot be seen because of T1, and the shadow cast by the shield covering all the coils prevents a view of all the chokes and resistors, but the tubes are easily seen. The other above-chassis components are behind them. The front panel has been removed to facilitate the view of the upper right hand corner of the main tuning capacitor.

The main tuning capacitor is a semi split stator, dual linear tank regressor type (PX–119–3), a very common type. You probably have one lying around in your condenser bin gathering dust.

The rotor is grounded to the chassis. Failure to do so has been known to result in gray hair, popped eyeballs and loose teeth. It has also been known to facilitate insurance claims on the part of widows.

Although the manufacturer of this capacitor intended it for all-band work, without any changes, any writer of construction articles worth his salt can find means of altering other components so that it becomes necessary to hash up the capacitor by pulling and bending its plates. Therefore this capacitor must be altered as follows:

Starting with the rear stator plate on the front section, remove the fourth rear rotor plate from the front. Then remove every third stator plate from this point rearward stopping at the front plate (stator or rotor) of the rear section. This will leave you with four double spaced stator plates and seven single spaced rotor plates, counting forward from the rear; of the front section, that is.

Two of these must be removed, starting from the rear of the front section, skipping two stator plates and dropping back to the next rotor plate to start. Pull this plate, then going forward, pull the third and fifth rotor plate.

This simple alteration completes the front section.

The rear section is altered in the same manner except that the unit is reversed so that you are looking at it from the rear of the rear section instead of the front of the front section. From this position the stator plates are pulled beginning at the front of the rear section instead of the rotor plates at the rear of the front part of the front section.

Otherwise the procedure is identical.

Now, in order to maintain 100 percent linearity, the last rotor plate on the front of the rear section must be carefully bent so that its outer

[*Continued on page 120*]

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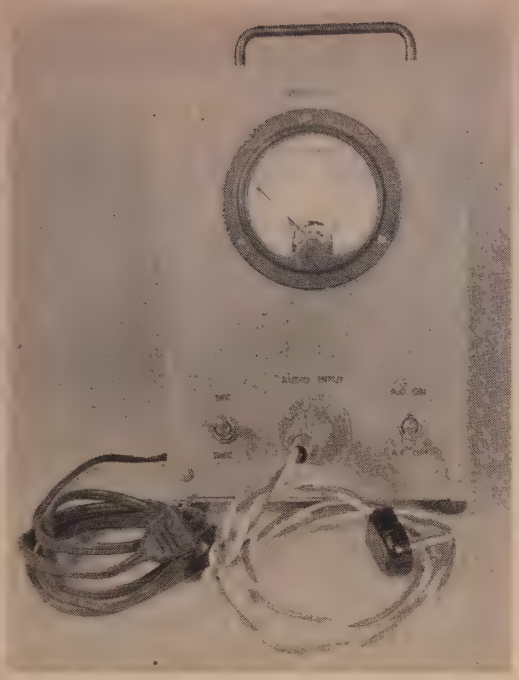
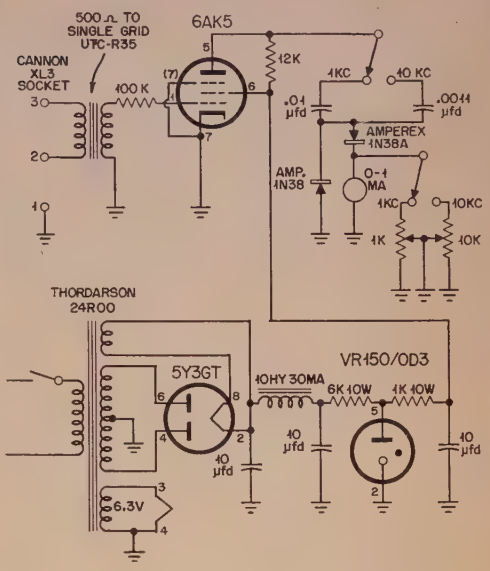
1. This Novice Limited Facilities opinion is not necessarily my own. I am merely conforming to the universally prevalent concept that the Novice, regardless of his previous station in life, upon receipt of that fateful ticket, is immediately reduced to the status of an impoverished illiterate, and that his Facilities, whether he owns stock in GM, or a uranium mine, become instantaneously, Limited.

Diplomas from MIT, or PHD doctorates become as nothing to this unfortunate moron. He is doomed to a year of ignorance and poverty, his harmonics monitored and hounded, until that magic day when the FCC hands him the tiny slip of paper that tells the world he is a General Class Operator!

His travail done, he can once again raise his head and stand eye to eye with his fellow man, part and parcel of the world that had been lost to him.



Complete frequency meter and schematic are shown left and below



Audio Frequency Meter

W. W. Wehe, W6VZB
16080 Cambrian Dr.
San Leandro, Calif.

This is one of those simple easy to build pieces of gear which are so handy to have around the shack. Constructed originally to measure radioteletype shift it is an audio frequency counter which reads audio frequencies from 50 to 1000 and 500 to 10,000 cycles directly on the face of a meter. This is done in two ranges selected by a switch on the panel allowing accurate and fast readings with no bother of interpolation or beating against audio oscillators.

Consisting of a single overdriven amplifier or square wave limiter coupled to two germanium diodes in a counter circuit. This circuit will cause a current to flow which is linear with relation to the incoming audio frequency. It is only necessary to couple in a signal strong enough to saturate the limiter and read the current flow through the meter which is calibrated in frequency. Actually there is no change to the meter scale itself. The instrument is marked zero to one milliampere and this is read zero to 1000 or 10,000 cycles depending on the position of the selector switch. Any type instrument can be used so long as it is one milliampere full scale.

Calibration

Calibration is accomplished by means of two potentiometers, one for each range. These are mounted within the case of the unit and once set can be forgotten. Either range can be calibrated at any point above half scale reading allowing any known audio frequency to be used as a standard. WWV transmissions can be used

[*Continued on page 122*]

Two Meters with the T-23/ARC-5

Harold Morris, W4VUO
Joe Westenhover, W4FEC
Langdale, Alabama

Interested in trying two meters? "Can't afford a Gonset," seems to be the stock answer.

Well, in the heyday of the surplus boom the availability and ease of conversion made the 522 a natural. However one piece of surplus equipment that seems to have been sadly neglected has been the versatile T-23/ARC-5 unit.

This little transmitter features four crystal controlled channels selected by means of a motor-driven rotating turret mechanism.

These channels can be utilized on other bands, usually six meters. The tube line-up consists of a 1625 osc. trippling in the output tank circuit to 24 mc, followed by a 1625 doubler whose output is in the 48 mc range, driving an 832-A push-pull tripler to the two meter range and an 832-A final working straight through for maximum efficiency.

Still with me? Well, let's warm up the old soldering gun and begin. First the contacts on relays RY1, RY2, RY3, RY5 are soldered together. This saves considerable rewiring, considering the neat harness wiring already in place; RY4 is left as is.

Filaments

The filaments are wired originally in a series parallel arrangement for 24 volts.

If 12 volt operation is desired the following changes must be made. Remove the lead from pin 7 of the second 1625 socket and attach same to pin 1 of the same socket, then ground pin 7. This places both 1625's in parallel. Moving now to the 832's, on the first one, the one nearest the back, remove the lead from pin 4 and attach to pin 1. Grounding pin 4 now completes the 12 volt path through the parallel 832-A tubes.

To provide modulated B plus to the final screen with a minimum of trouble, wire in a 40,000 ohm, 5 watt resistor from the center terminal of RY5 to pin 1 of the rear receptacle. This relay must also have the movable contact soldered down to the plate lead terminal of the relay.

If desired a f-m modulator using a 12v TV type tube could be built at less cost than an AM modulator. See any radio handbook for details.

Crystals

If the original type crystals Cr-1 or similar ones are used in the 8 to 8.222 mc range the socket terminal board is used as is; however if FT-243 type crystals are to be used, the sockets must be modified. Remove the ground lead and the 4 mounting screws and gently turn it upside down. This provides easy access to the terminals for a slight pinching job with a pair of long nose pliers. The terminals will easily crimp tight enough to firmly grip the smaller pin crystals, replace the screw and then replace the ground lead and a nasty crystal socket substitution has been eliminated.

Now upon looking over the almost finished transmitter the co-ax relay (24 V.D.C.) stands out like a useless sore thumb. Hmmm should be some way to utilize that antenna change over.

So let's clip the coil leads of the relay from the 24 volt source and ground one lead. To flip the relay we can run the cathode of the second 1625 stage, the doubler, up through the coil. So looking back to the 1625 socket unsolder from ground the cathode bias resistor and add near by an insulated terminal, wiring the free end of the resistor to this terminal and run a lead from there back to the free lead of the coax relay. Cathode current will now cause the relay to operate as the rig is turned on and off without any external circuits.

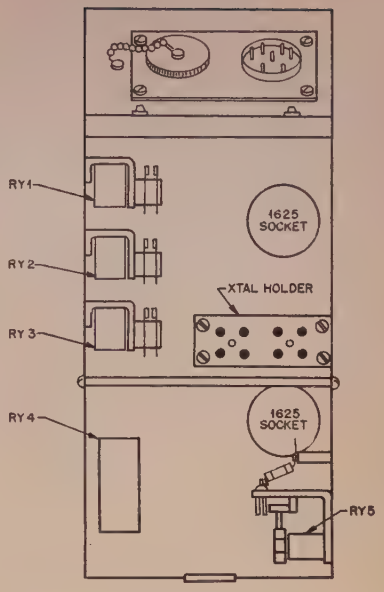
Bottom view

Top view

This co-ax relay also provides a sound check of the osc. because if the osc. is not oscillating the relay will not operate.

Well, we still have the problem of changing the channels so let's look closely at the small motor. The name plate says it's a 28 VDC shunt wound motor, but since we are not going to run it for more than a few seconds at the time, changing channels, it can be operated from the a-c filament supply without any changes, other than adding a push to rotate switch in series with the hot lead going to the nearest 832 filament supply and grounding the other lead. It will rotate nicely in about ten seconds per complete revolution using a 24 v. supply. The little unit in operation at W4FEC's shack has been in operation for about six months with no motor trouble.

That completes the two meter conversion mechanically, so let's tune her up.



Location of relays

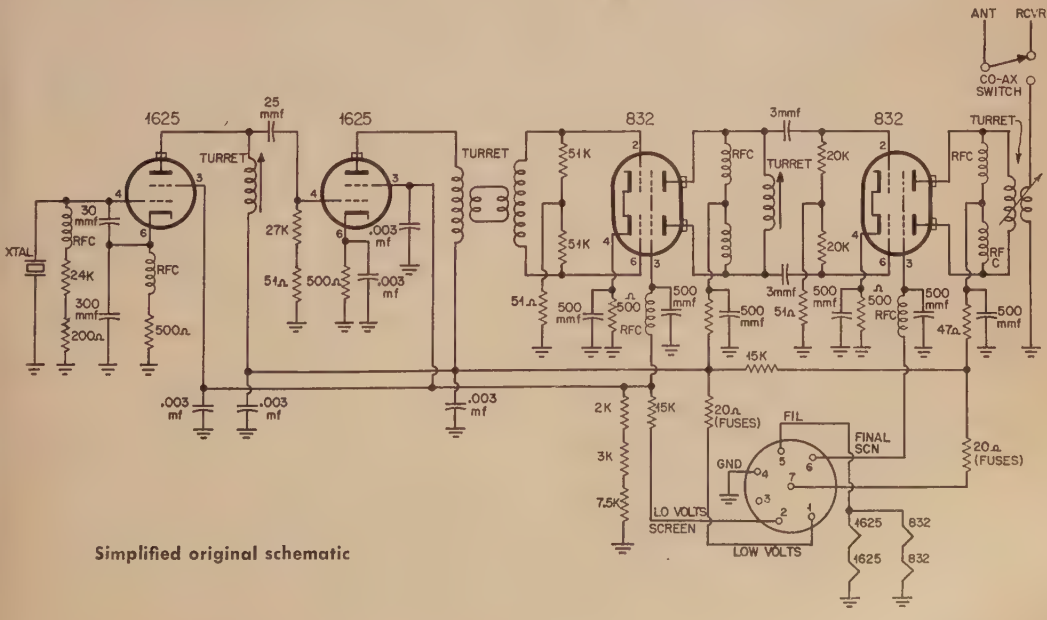
Tune Up

At this point a grid dip osc. or indicating wave meter is nice but not absolutely necessary as the unit can be tuned with patience and a one watt neon bulb.

What! You don't have a TV repairman's type socket wrench to adjust the channel slugs? Hoot mon just pull the rubber from a wooden pencil and with the trusty long nose pliers form the metal band to fit the slugs, if they seem stuck apply a small amount of penetrating oil, and let the rig stand over-night until the slug has time to loosen. Before adjusting the slugs with the voltage applied be sure to apply two layers of Scotch tape to the wooden pencil shank as a safety factor. Starting at the osc. plate tune for max. brilliancy of the neon and check on the station receiver to see if the third harmonic of the crystal has been selected. The construction of the various coils make selecting the wrong harmonic almost foolproof. Working forward one stage at the time, you will soon have the rig on the air.

In selecting the channels for use on the various bands, the most desirable for two meters are B and C. Channel D will also work, but only in the high end of the band without modifying. Channel A is best suited for six meter operation.

[*Continued on page 121*]



Simplified original schematic

Simplified Loading of PI Coupled Amplifiers

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The virtues of the π network as a means of coupling r-f amplifiers to antennas are too well known[1] to be repeated here. Suffice it to say that their ability to suppress harmonics, their flexibility in multi-band amplifiers and their capacity for matching loads of wide impedance variation are not to be found in similarly unsophisticated coupling methods. Yet, popularity of the π network among amateurs has never been great.

Perhaps one reason for this seeming paradox is the complex math required to compute values of L and C for various plate loads and output loads. Another reason might be a lack of a simplified tune up procedure. This discussion will attempt to eliminate such causes for objection to so excellent a coupling device.

Admittedly the formulas normally required for computing component values are formidable. But, in 1954, Mack Seybold, W2RYI, came to the rescue. He not only worked out the math, but he put the answers in a convenient table. In equally convenient form he also set up recommended plate loads for a great number of tubes commonly found in present day amateur transmitters.

Thanks to Charles Howard, W2QIH, Technical Editor of RCA Ham Tips, permission has been obtained to reproduce these Tables. Consumption of the July-August 1954 Ham Tips, in which they were first published, was great. Yet a great number of amateurs have either forgotten what W2RYI worked out or thought they had a better means for arriving at proper values.

It is not uncommon, on any band, to hear "A π network won't load *this* antenna". What the complainant is actually saying is, "I don't know how to tune a π network". This is true because a π network will load anything even remotely resembling an antenna. It is to these amateurs that the following is directed.

The first information needed is the plate load of the RF amplifier. W2RYI has worked this out in Table I*. Here many popular final amplifier tubes are listed along with recommended plate, and, where required, screen voltages. The last column which is headed "Plate Load, Ohms" lists impedances ranging from 1,500 to 6,200 ohms.

It should go without saying that these impedances are not dependent upon the type of tube. For example, Table I shows the plate

Table I

Estimated Plate Loads for Typical Operating Conditions.

Tube Type	Service	Emission	E_b	E_{c_2}	I_b	P_o	Plate Load
			volts	volts	ma	watts	ohms
813	ICAS	CW	2,250	400	220	375	5,100
	CCS	CW	2,000	400	180	275	5,500
	CCS	CW	1,500	300	180	210	4,200
	ICAS	Phone	2,000	350	200	300	5,000
	CCS	Phone	1,600	300	150	180	5,390
813's (Parallel)	ICAS	CW	2,250	400	440	750	2,600
	ICAS	Phone	2,000	350	400	600	2,500
807	ICAS	CW	750	250	100	54	3,700
	CCS	CW	600	250	100	40	3,000
	CCS	CW	500	250	100	32	2,500
	ICAS	Phone	600	300	100	44	3,000
	CCS	Phone	475	250	83	28	2,900
807's (Parallel)	ICAS	CW	750	250	200	108	1,900
	ICAS	Phone	600	300	200	88	1,500
6146	ICAS	CW	750	160	120	70	3,100
	ICAS	CW	600	180	150	66	2,000
	CCS	CW	600	150	112	52	2,600
	ICAS	Phone	600	150	112	52	2,600
	CCS	Phone	475	135	94	34	2,600
812-A*	ICAS	CW	1,500	—	173	190	4,300
	CCS	CW	1,250	—	140	130	4,500
	ICAS	Phone	1,250	—	140	130	4,500
	CCS	Phone	1,000	—	115	85	4,300
4-65A**	CCS	CW	1,500	250	150	170	5,000
	CCS	CW	600	250	140	54	2,100
	CCS	Phone	1,500	250	120	145	6,200
	CCS	Phone	600	250	117	50	2,500
4-125A/4D21	CCS	CW	2,500	350	200	375	6,200
	CCS	CW	2,000	350	200	275	5,000
	CCS	Phone	2,000	350	150	225	8,200
	CCS	Phone	2,500	350	152	300	6,700
4-250/5D22	CCS	CW	3,000	500	345	800	4,300
	CCS	CW	2,500	500	300	575	4,100
	CCS	Phone	3,000	400	225	510	6,700
	CCS	Phone	2,500	400	200	375	6,200
2E26	ICAS	CW	600	185	66	27	4,500
	CCS	CW	500	185	60	20	4,200
	ICAS	Phone	500	180	54	18	4,600
	CCS	Phone	400	160	50	13.5	4,600

***Grid Neutralization.**

****Typical operating conditions at higher plate voltages are published, but plate impedances are too high for convenient pi-network operation.**

* By A. M. Seybold, W2RYI, RCA Ham Tips. Used with permission of RCA, copyright proprietor.

Table II Components for Pi-Coupled Final Amplifiers*

Estimated Plate Load (ohms)		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000*	NOTES
C_1 in $\mu\mu$f,	3.5 Mc	520	360	280	210	180	155	135	120	110	90	The actual capacitance setting for C_1 equals the value in this table minus the published tube output capacitance. Air gap approx. 10 mils/100 v E_b.
	7	260	180	140	105	90	76	68	60	56	45	
	14	130	90	70	52	45	38	34	30	28	23	
	21	85	60	47	35	31	25	23	20	19	15	
	28	65	45	35	26	23	19	17	15	14	11	
L in μh,	3.5 Mc	4.5	6.5	8.5	10.5	12.5	14	15.5	18	20	25	Inductance values are for a 50-ohm load. For a 70-ohm load, values are approx. 3% higher.
	7	2.2	3.2	4.2	5.2	6.2	7	7.8	9	10	12.5	
	14	1.1	1.6	2.1	2.6	3.1	3.5	3.9	4.5	5	6.2	
	21	0.73	1.08	1.38	1.7	2.05	2.3	2.6	3	3.3	4.1	
	28	0.55	0.8	1.05	1.28	1.55	1.7	1.95	2.25	2.5	3.1	
C_2 in $\mu\mu$f,	3.5 Mc	2,400	2,100	1,800	1,550	1,400	1,250	1,100	1,000	900	700	For 50-ohm transmission line. Air gap for C_2 is approx. 1 mil/100 v E_b.
	7	1,200	1,060	900	760	700	630	560	500	460	350	
	14	600	530	450	380	350	320	280	250	230	175	
	21	400	350	300	250	230	210	185	165	155	120	
	28	300	265	225	190	175	160	140	125	115	90	
C_2 in $\mu\mu$f,	3.5 Mc	1,800	1,500	1,300	1,100	1,000	900	800	720	640	500	For 70-ohm transmission line.
	7	900	750	650	560	500	450	400	360	320	250	
	14	450	370	320	280	250	220	200	180	160	125	
	21	300	250	215	190	170	145	130	120	110	85	
	28	225	185	160	140	125	110	100	90	80	65	

* Values given are approximations. All components shown in Table II are for a Q of 12. For other values of Q, use $\frac{Q_a}{Q_b} = \frac{C_a}{C_b}$ and $\frac{Q_a}{Q_b} = \frac{L_b}{L_a}$. When the estimated plate load is higher than 5,000 ohms, it is recommended that the components be selected for a circuit Q between 20 and 30.

load of a 6146 to be 3,100 ohms when the plate voltage is 750 volts and plate current is 160 milliamperes. By the same token, any other tube or tubes with 750 volts on the plate at 160 mils of plate current has exactly the same plate load, 3,100 ohms.

Should some other voltage/current values be used that are not listed in Table I, the following simplified formula will give a close enough approximation;

$$\text{Estimated Plate Load (ohms)} = \frac{E_b}{2I_b} \text{ or,}$$

simple multiply the plate current at which you expect to operate the amplifier by two. Divide that sum into the plate voltage. The answer is in ohms.

With the plate load so determined, consult Table Table II*, Components for π Coupled Amplifiers. Estimated plate loads are across the top. Values of C^1, L, and C^2 are listed below each plate load for all amateur bands from 3.5 mc through 28 mc. Two sets of values are listed for C^2, one for 50 ohm and the other for 70 ohm transmission lines.

Now, let's put these two tables to work. Assume a final amplifier, just for example, with that 6146 operating at 750 volts, 160 mils. Table I estimates the plate load at 3,100. For 3.5 mc operation into a 50 ohm line, Table II says we need approximately 180 $\mu\mu$fd for C^1; 12.5 μh for L; 1,400 $\mu\mu$fd for C^2. These will be the starting values for the tune up.

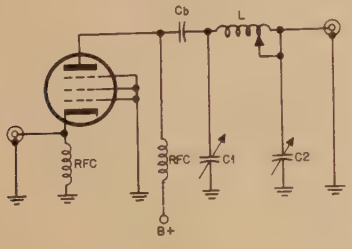


Fig. 1.

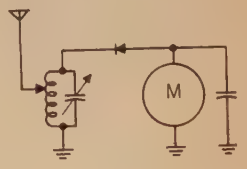


Fig. 2.

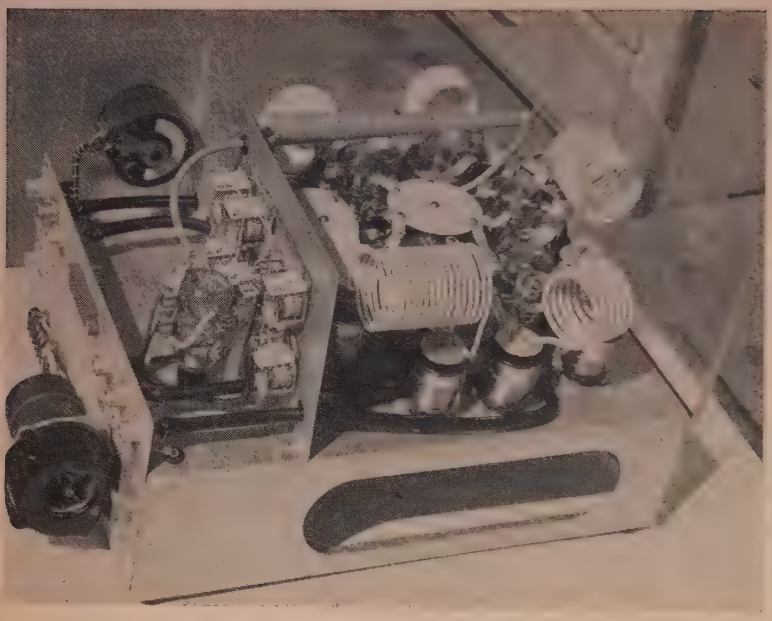
A most important device for this and other uses is a simple field strength meter, *fig 2*, such as recently described[2]. In fact, the field strength meter is a must as will be shown later.

First, set C^1 to as close to 180 $\mu\mu$fd as can be estimated.

Second, set C^2 to as close to 1,400 $\mu\mu$fd as can be estimated.

Third, with antenna connected to amplifier, turn on plate voltage and excitation to amplifier. Adjust L for maximum reading on the field strength meter. With rotary variable inductors, this is accomplished by cranking turns in or out. If a tapped inductance is to be used, a different procedure, that will be explained later, is required.

[*Continued on page 106*]



Oblique view. Blower can be seen at lower left. Left center shows RF-5 vacuum relay switch. Small air relays are used for switching the antenna to the receiver. Center disc with leads radiating to the switches is connected to the parallel plates assembly. A lucite panel was used for effect only. Also, coaxial connections on rear are for connecting the various beams or antenna arrays to the amplifier.

Model "Lazy Man's" Transmitter

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You occasionally read of the latest "transmitter to end all transmitters," and when the article is written the unit usually qualifies for that title. Various approaches to a transmitter with simplified operation come under the category of (1) auto-tune, (2) band switching or (3) separate transmitters for each band. Having considered the possibility of these various methods and rejecting each as being too cumbersome, bulky or difficult to operate, I finally came up with a design which seems to fulfill the need for extremely rapid band switching, relatively small space and a minimum number of tubes. The transmitter was built under the capable hands of Paul Barton, W6JAT, who was responsible for its final design, construction and efficient operation.

Input Circuit

Conventional design procedures would use a resonant grid circuit on each frequency. Relays would be necessary for band switching when used at a remote operating position. If these various components are multiplied by the number of bands, the grid circuit takes on sizeable proportions which generally result in highly undesirable resonant characteristics. In fact, the first model required neutralization when a different type of tetrode tube was employed in the linear amplifier. If the grid circuit is examined carefully it will disclose a basic shortcut we employed. The coaxial cable

is isolated from the grid by a capacitor and is used to excite the grids of the tubes directly. A swamping resistor is used to dissipate energy from the exciter and stabilize overall operations in the transmitter. After operating this circuit its real advantages are realized in the stability and simplicity of the amplifier. It is true that a small amount of power is wasted in the straightforward coupling system; however, our driver has adequate power. The resultant output, of course, is not impaired in any way and the efficiency is just what it was expected it to be.

A suitable amplifier must first get the excitation to the grid of the tube in the simplest and most efficient way so the amplifier can perform as designed. Results seem to indicate that this has been achieved.

Output Circuit

Knowing that successful operation of any output circuit depends on low losses in the switch gear, a DPDT vacuum switch was designed for this amplifier. The two poles are used to connect the input and output of each pi-net circuit to the 4W300B final tube and also to the antenna. Miniature relays are used in the transfer circuits of the receiver only. Having separate resonant circuits for each band permitted the proper Q to be maintained by switching in the desired tuned circuit for each band with vacuum relays. Since the linear amplifier requires a low Q, and since the antennas are over-coupled, it is possible to maintain very uniform output over the voice portions of the bands simply by resonating the tank circuit to the center of each telephone band. If telegraphy is used, the slight drop in output at the extremes in frequency is difficult to detect at the receiving location. Once the transmitter is loaded to the different antennas it is only necessary to adjust the VFO at the operating position. The *Johnson* Pacemaker is an excellent VFO and exciter. We found this so satisfactory that any stranger coming into the shack could just turn the final bandswitch knob and be on the right band.

Established methods of tuning band switch equipment requires routine and a degree of dexterity which this system eliminates. Different antennas must be sequenced to the receiver and transmitter for each band. This approach has removed the time consuming problem, as well as the possibility of getting the equipment out of tune and damaging some part due to overload.

A new vacuum switch, *Jennings type RF5*, is employed as a position of the transmit-receive circuit to disconnect the plate and screen voltage simultaneously from the tube. When this switch is used to disconnect the high voltage from the tube, other relays function to silence the exciter and to apply the antenna to the receiver. Other methods of switching and frequency control may be employed successfully but we had all of the vacuum components necessary for this design and tried to incorporate every part in its most effective location. The power supply for the screen, bias and plate are conventional except that I incorporated conventional stabilizing means to keep the voltage constant under the variations in plate current of the tube when on SSB.

[*Continued on page 118*]

Front view of amplifier showing various meters, as well as tank circuits for each band. Conical coil, upper center, is rf choke made with manganin copper covered wire to eliminate resonance on all bands.

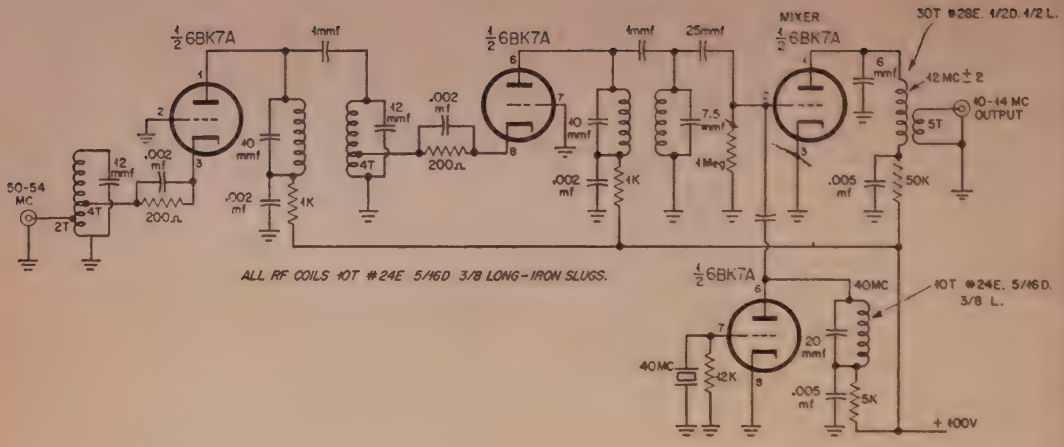

Fig. 1

Grounded-Grid Converters

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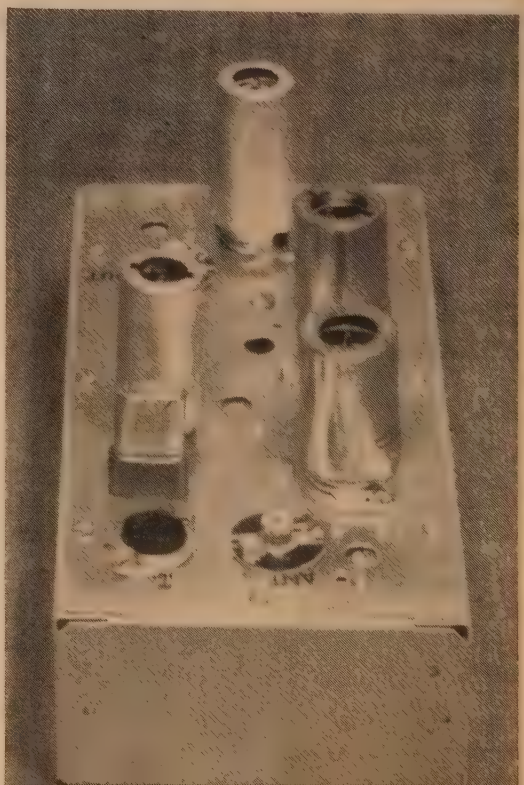
Many inquiries have been received concerning the use of tubes such as the 6AJ4 grounded grid tube for RF amplifiers in VHF converters since the articles appeared in print using the 5842-417A and the 416B tubes. These tubes are very costly and not readily obtainable in radio supply stores. Tubes such as the 6AJ4, 6AN4, and 6BC4 are available and at far less cost but are not as good for 144 megacycle use and haven't been used in many 144 mc receivers except in cascode circuits which require two tubes per r-f stage. However, these moderately priced tubes can be used in grounded grid circuits with very good results and excellent stability if the input circuits are "mismatched" to improve the noise figure.

The converters illustrated here were built to test out some ideas and are not laid out very neatly since these were strictly experimental models subject to many changes. For example, the variable capacitor tuned circuits in the 144 mc converter were not mechanically good and slug-tuned coils could be substituted with only the tube input and output capacities across the variable inductances. The 50 mc converters shown with slug-tuned coils resulted in a much cleaner and better layout. In any broadband (four megacycle bandwidth) converter, the circuit Q should not be too high nor too low and iron dust or brass slug tuned coils of small size function in the desired range of Q values. Too high a Q results in less than 4 mc pass band and too low a Q results in excessive image responses.

In general, any 144 or 50 mc converter should have four to five tuned circuits in the r-f band in order to minimize spurious signal responses and not attempt to convert to an i-f frequency of much more than 1/5 of the

144 mc converter of fig 3

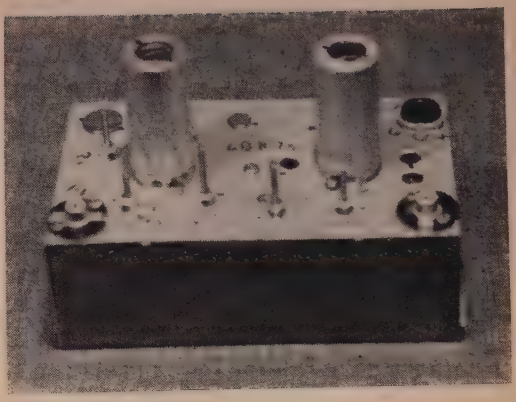


signal frequency, as for example, 30 mc for 144 mc and 10 mc for 50 mc service. Too many converters for these two bands have been built in the past with only two or three tuned circuits and too low an i-f output such as 10 mc for 144 mc band. These converters in most receiving locations are full of troublesome spurious signals which may interfere with weak signal reception. Some converters have as low as 15 to 20 db image rejection, whereas at least 60 db is needed and 80 db is very desirable as more commercial stations or services near the amateur bands are being used every day.

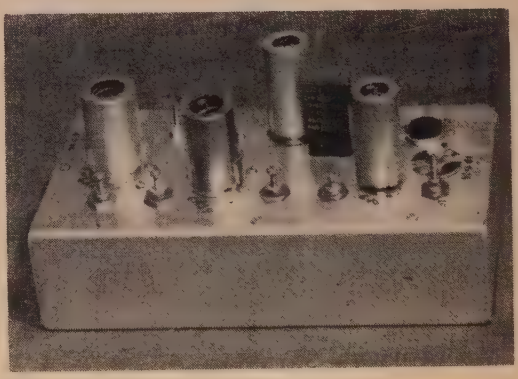
A grounded-grid stage has better stability than a neutralized triode amplifier and can be made to have as good a noise figure by proper coupling to the antenna circuit. Apparently the noise figure can be improved by making the antenna feeder impedance look like a value two or three times that of the input impedance of the tube. This is opposite to the effect required for a grid input tube such as a cascode, a neutralized triode or a screen-grid stage. In nearly all grounded grid tubes a compromise between transfer loss and noise figure improvement takes place when the impedance looking into the tube is between 200 and 300 ohms in the 144 mc band. The actual input impedance may be from 50 to 150 ohms so many grounded grid tubes have the cathode connected directly to the 50 or 70 ohm coax jack. This gives maximum gain but the noise figure deteriorates one to two db so for weak signal reception the cathode should look into at least 200 ohms.

There are many methods of obtaining this mismatch such as a quarter wave section of 100 ohm coax line connected between a 50 ohm line and the cathode of the first RF tube. Other arrangements use tuned circuit with the cathode tapped across about twice as many turns as for the 50 ohm coax line connection. In this connection, the whole tuned circuit can be connected across the cathode and the antenna tap made at the center of the coil with the result of a low Q input circuit but best noise figure by ½ to 1 DB. In most receiver locations a moderate Q value in the input circuit helps eliminate cross-talk and image responses, so a slight loss in noise figure is made. In the experimental converters shown here it was found that a good compromise on circuit Q and noise figure resulted when the antenna tap was up half as far as the cathode tap on either 50 or 144 mc. This is the input circuit of *fig 1*, in which two dual triodes serve as two grounded grid stages, a mixer and an overtone crystal oscillator. The dual triode tends to be a little unstable even at 50 mc and definitely so at 144 mc so two single triodes are better.

The interstage coupling circuits of *fig 1* are of a band-pass type to cover from 50 to 54 mc. The needed coupling between circuits



50 mc converter of fig 1



50 mc converter of fig 3

can be obtained by 1mmfd condensers or by means of link coupling of one to two turns around each coil as shown in *fig 2*. The converter of *fig 1* has an i-f stage added for operation into a relatively insensitive H-F receiver which is tuned from 10 to 14 mc to cover the 50 to 54 mc band. This added i-f stage (one half of the 6J6 dual triode) is not needed with an average good short wave receiver and the mixer plate circuit can be broadly tuned to 12 mc±2, and either a single triode used as the mixer, or a dual triode will serve as oscillator and mixer. (*fig 1*)

The crystal oscillator of *fig 1* functions with 40 mc overtone crystals while that of *fig 2* will oscillate at 40 mc with some surplus 8 mc cyrstals at the fifth overtone or 5.7 mc (17 mc third overtone crystals) at the seventh overtone. This circuit is more regenerative because of the one turn feed-back loop over the plate coil, connected in series with the crystal. The winding direction of this single turn is such as to make it look like a Hartley oscillator circuit, with the plate going into one end of a continuous winding and the grid (crystal) out the other with ground and plus B connections tapped into the coil.

The input circuits of both 144 and 50 mc

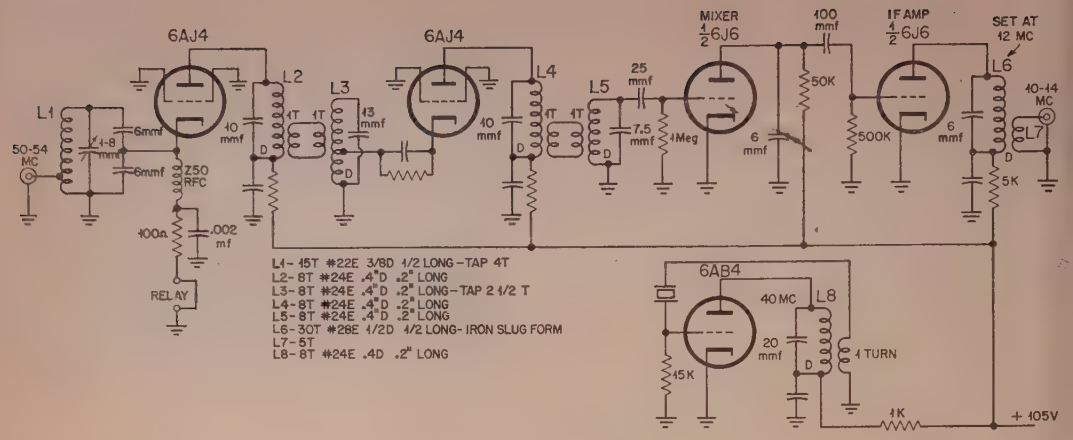


Fig. 2. L1 through L5 and L8 are tuned with brass slugs.

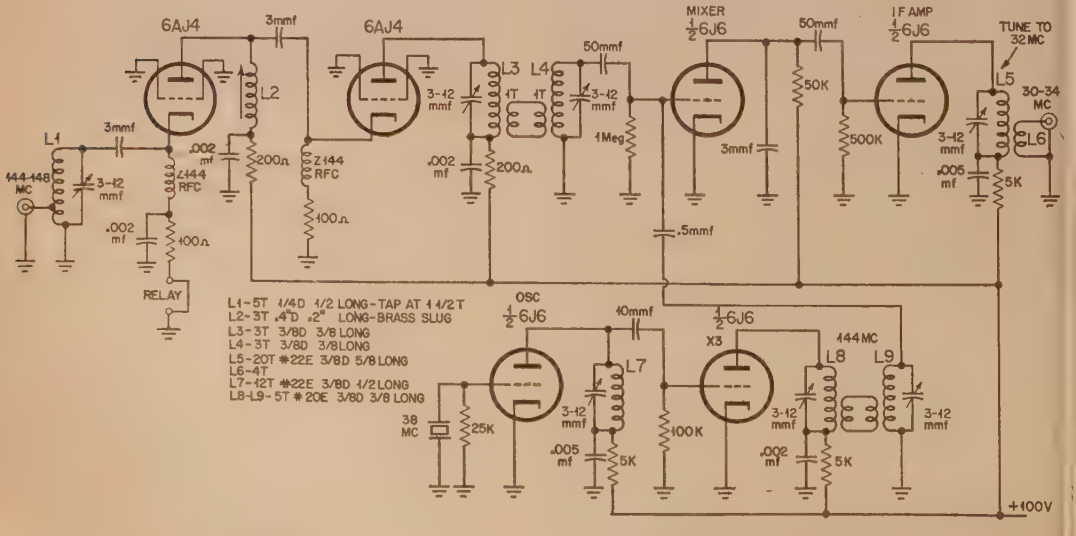
converters of *fig 2* and *3* makes use of a capacitive divider to make the input impedance of the antenna tuned circuit look like 200 to 400 ohms to the cathode of the 6AJ4 tube. At 144 mc, the input capacitance of the tube to ground in connection with a 3 mmfd series condenser, forms a voltage divider similar to a tap on a coil but has the advantage of eliminating a secondary resonance frequency which takes place with a coil tap and the input tube capacity. Its disadvantage is in the need for an r-f choke such as a type Z144 *Ohmite* choke for the two meter band and a Z-50 r-f choke for the six meter band, in series with the bias resistor to ground. Incidentally, the d-c cathode return circuit should be opened by a relay or by auxiliary antenna relay contacts if high powered transmitters are involved. Leakage thru the antenna relay can burn out the input tube of any converter in the VHF or UHF bands.

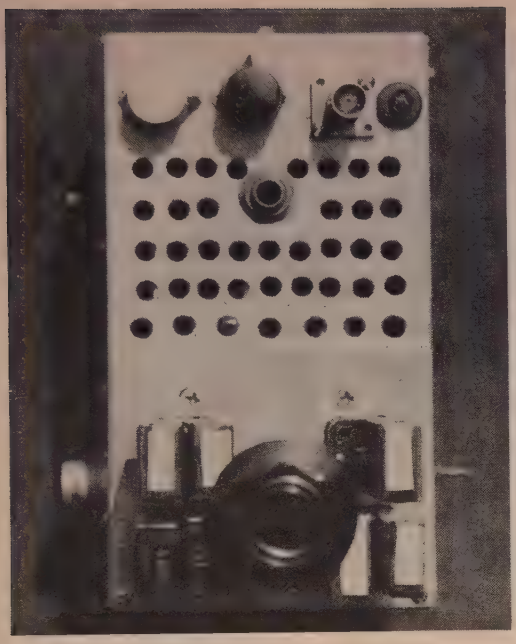
The capacitive divider of *fig 2* is suitable for 50 mc with a series value of 6 mmfd and a similar shunt condenser across the input capacitance of the tube. At 50 mc the bandpass circuits need about 10 to 15 mmfd total capacity across each slug tuned circuit. These brass slug coils consisted of 8 turns of 24e. on a *Millen* coil form about .4 inch diameter, wound to cover .2 inch. A winding of 10 turns ¼ inch long on a ⅜ inch diameter CTC form would be equivalent. In *fig 1* the 50 mc coils were wound on 5/6 inch diameter surplus type forms with powdered iron cores with a winding length of ⅜ inch. The input capacitance of a triode mixer seems to be higher than that of the r-f output circuits so either a smaller fixed condenser is required or one or two turns less on the coil connected to the mixer.

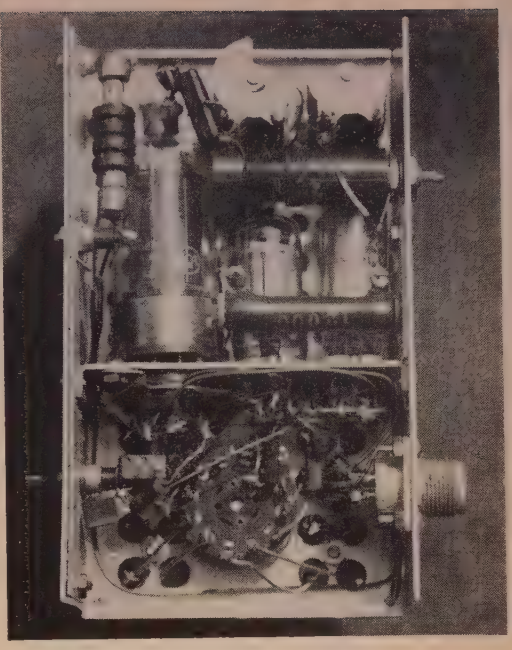
The converters of *fig 2* and *3* were built on

[*Continued on page 108*]

Fig. 3







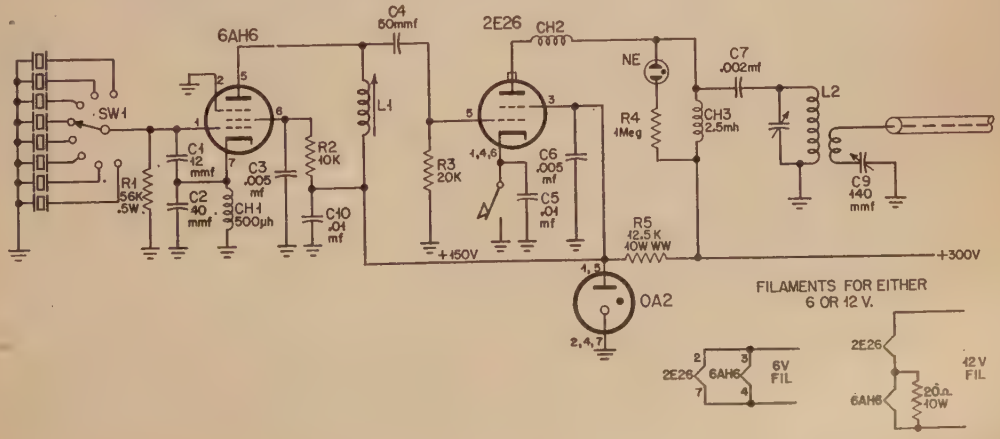
Good grief, what next?

40 Meter Mobile CW

E. H. Marriner, W6BLZ
528 Colima Street
La Jolla, California

There have been many articles written on mobile transmitters for the phone man, but none for the CW or Novice. Mobile c.w. is a strange subject; when mentioned everyone looks at you askance. Actually, besides the love of "yakking," there are a lot of amateurs that just want reliable communication back to the old homestead, and the only way to do it is on c.w. On vacation trips I found that the mobile phone link broke down in a hurry and for the most of the trip the wife was wondering if the neighbor boy was watering the Begonias or if our rabbit was being fed. Then c.w. was tried and the schedules were maintained nearly 100%. A good c-w man can copy in his head while driving, so mobile c.w. is no trouble. However, the unenlightened will have to let the XYL drive

[*Continued on page 116*]



QRR

Major W. M. Wood, W1ECF
Build 2118, Apt. D.
Loring AFB, Maine

Scene of accident. Trail at lower left made by rescue tractors.

This Could have been You

Time 1600, 10 January, 1957

"May Day, May Day." "This is W1ECF, Loring AFB Maine, calling for any amateur mobile stations in the Limestone Maine area." Words that were tense and urgent were broadcast on 3875 kc, the amateur emergency frequency on 80 meters. These were words that were not new. I had used them on two previous occasions and well realized their meaning.

"May Day, May Day. Any mobile Amateur in the Limestone, Maine area," I repeated as my heart beat rapidly and that cold desperate feeling kept gnawing through me.

Why? Well, it started when two of the pilots in the squadron needed flight checks and I, as operations officer, had scheduled them for a ride.

Time 1220, 10 January, 1957. My C.O. and I were in my office discussing the next weeks schedule. Things looked good and we were beginning to show progress in training our Strategic Air Command crews into a really fine B-52 combat organization. I had to attend a meeting at Wing Headquarters at 1300, so excused myself at 1240 and started for the "Head Shed." As I walked out the door I noticed several people looking into the southeast and glanced there also. How does one describe the sudden awful feeling of dread? There it was, the familiar pall of black smoke that can only come from one source, great quantities of fuel on fire. Fear, stark and cold froze me in position for uncounted moments as I realized the implication of this obscene black cloud that spelled aircraft accident so clearly. I tore myself away and ran back to the building to make the dreaded call to alert crash and rescue. Others had seen it also, for as I ran into the Ops building my C.O. was already on the phone confirming that tragedy had struck. We had two B-52s up that day plus the two of our pilots that were flying with another squadron. We quickly accounted for our two planes then headed for Wing Control. By this time, though it wasn't confirmed until later, we had a good idea that it was "Jumping Bean 60" with our two pilots and the crew from another squadron, whom we all knew as only a close knit combat organization can know one another.

The Wing Control room was a beehive of activity since each aircraft in flight had to be accounted for. Presque Isle Air Force Base, twenty miles to the southwest, reported all theirs accounted for and reports began to come in from CAA stations throughout the New England area. Every few minutes the

Joe, W1DTK

Wreckage

radio would blare out with our approach control station calling, "Jumping Bean 60, if you read acknowledge." Words that twisted deeper with each repeat. Now reports began to arrive by telephone from farmers and townspeople reporting an aircraft had blown up and crashed. Reports of parachutes and locations that centered the area of the crash near Andover, New Brunswick, just eight to ten miles southeast of Loring Air Base, across the border in Canada.

Crash equipment was on the way and thanks to Lt. Col. Jack Risher who had observed the tragedy and headed for the scene in his automobile, we began to get some accurate telephone calls giving road directions. Maine, especially northern Maine, has few roads and during the winter, excursions from the primary roads is foolhardy due to drifting snow and ice. Canada, our neighbor to the north, east, and west, has even fewer roads and is sparcely populated.

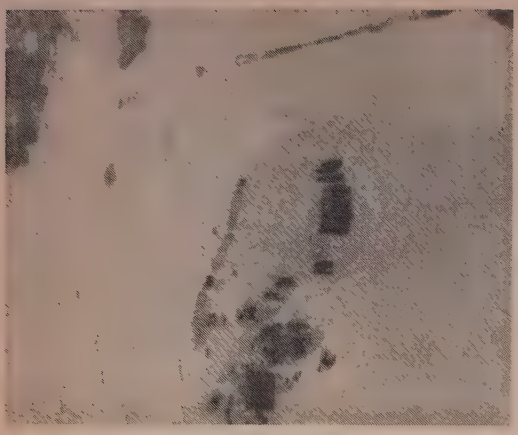
As all crashes seem to happen, this one had occurred in one of the most rugged portions of the province, mountainous, densely wooded, with few roads and lots of snow.

How does one feel as the phone calls dwindle off and it becomes very apparent there might be survivors, but they were down in practically inaccessible terrain in temperatures that were well below zero? How many go out? We must get aid to them fast! Humans can't live long exposed to sub-zero temperatures, especially when injured and suffering shock.

The helicopters were now up and proceeding to the area and a few phone reports still filtered through giving the general area of the crash and the fact that parachutes had been sighted floating down in the general area of Andover, New Brunswick. The clock had moved to after 1500 hrs. when word flashed back that one of the survivors had been found and was being flown back by helicopter. The actual crash area was now pinpointed and the search was on.

As I stood in Wing Control the awful helpless feeling of how can I help, what can I do, kept eating at me. As the minutes passed the horrible realization of being responsible for our squadron pilots being on that aircraft kept hitting me. As these thoughts kept stabbing through me I began to notice how difficult the search was proving to be and how terribly it was being hampered by the lack of communication to keep it organized. I got the attention of our Commanding General, who was extremely busy directing the search, and suggested organizing a radio net in the area of the search of "Hams" and their mobile equipment. With his nod of approval I finally had something with which to help, a thing which was desperately needed, communications.

My wife thought I was possessed as I rushed into our quarters scant minutes later and started flipping switches and tuning up the rig. Time 1600 hrs. 10 January 1957 and the call "May Day." By 1605 I had contacted John, W4DPC/1, at Loring AFB and a few moments later Rusty, K6MPJ/1, was also in the net. Now we had radios, mobiles at that, and I had something to dispatch to the scene immediately. Both Rusty and John met the call with spirit and enthusiasm that is so rare that I will always admire them for it. With no questions asked they sped to the scene and within 40 minutes of the first call we had established radio contact between the Wing Control Room and the search parties. We were now providing the one vital link that was needed to weld together a search and rescue operation of enormous proportions. As soon as Rustys' presence was noted by the rescue parties, calls for information and assistance be-



Temporary search base station

gan arriving. Snow plows were needed to open some of the snowed-in roads, a bulldozer was needed to cut a path through great drifts of snow and timber to the actual point of the crash, food was needed for the searching personnel, along with flash lights, flood lights, block and tackle to lift wreckage to permit the removal of bodies and the search for survivors. Some semblance of order and direction began taking shape now that communications had been established and Wing Control could sift the inflowing information and plot sightings and implement a plan of action. Directions could now be gotten to those in the area of the crash to coordinate their efforts and as dark approached the need for vehicles to patrol the road between the base and the scene of the accident became very evident. Equipment was becoming lost on poorly marked country roads, so I dispatched John from the scene to patrol the road and by this time Weldon, W1GGW, and Gene, W1VSL, had checked in, so Weldon was dispatched to Wing Control to lead a convoy including a weasel, a wrecker and associated equipment to the accident scene. Gene stood by in Limestone to intercept a badly needed gas truck and lead him to the area.

Please QSY OM ...

By now the New England "Sea Gull" net was warming up on the frequency and I lost contact with the low powered mobiles due to QRM. A call to the net control station W1UZR precipitated one of the most stirring exhibitions of assistance I have ever witnessed during an emergency situation. Operators I had never heard before grasped the situation and took immediate action to assist. W1FNT and W1VYA got in touch with the FCC in Boston and succeeded in getting the frequencies 3935 through 3945 kc declared emergency frequencies, while others such as W1TZ, W1WRZ, W1HUL, W1UZR, W1UDD, W2KHU, W2AI, K2SCQ, W2LQL, W3VMC, W4ZCL, W4CLH, W4AQL, and W4YJE provided the policing necessary to clear the emergency frequency by frequent QST's and by putting up an impenetrable wall on both sides of the frequency we were actually working on, 3940 kc. Without the help of those above and others that didn't call in, but stayed off the frequency I could never have stayed in contact with the mobiles that were operating. Copy would have been impossible without the whole hearted support of our fellow ham friends listed above who stayed with us throughout the night and into the next day.

By 2200 on the 10th of January eight of the nine crew members had been found and we had a good indication from the reports received that the missing man had parachuted down. The search was on in earnest, for one of the eight had been picked up by helicopter

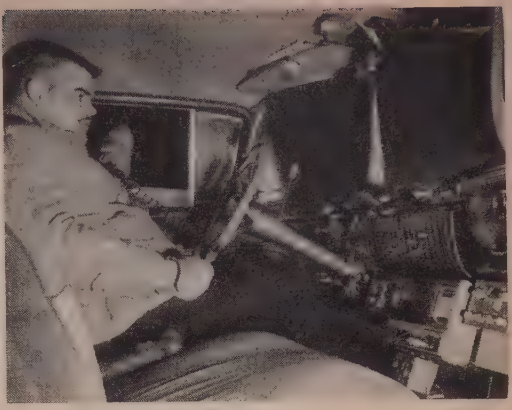
Interior of the bus which provided higher power near the crash site.

and flown to the base hospital in serious condition. The party at the wreckage needed crowbars and heavy lifting equipment to permit the removal of bodies and the search of compartments in the wreckage not accessible in their present position. Doctors were needed to assist in the removal of remains to the hospital for identification and to treat several of the search party for frost bite. At this time the temperatures were down to 15 degrees below zero, temperatures that required immediate rescue if lives were to be saved. All during the night of the 10th a search party of 50 men combed the area of the wreckage trying to determine if another body was still in the wreckage. We were now fighting time and our only link with the field was through Rusty, John, Weldon and Gene. More food, warmer equipment, trucks, busses, heaters, lights and gasoline were all needed and obtained through the communications link we had established, while the control room was in constant contact with the searchers directing their movements to insure no area had been left unsearched.

On the 11th the search still continued with no trace of the missing man, but by now Joe W1DTK and Will W1AYX were with us to help keep the net going. By 0600 on the 11th we had over 300 men plus 4 helicopters and an SA16 on the job. Much had to be coordinated between the search parties and the Control Room to insure the utmost in efficiency and that no stone was left unturned. Temperatures at this time were between 20 and 25 degrees below zero in the search area and required extreme caution for control to be maintained with the searchers to preclude casualties. All this coordination was done through the amateur radio link Rusty, John, Gene, Weldon, and myself had established. By now we had been up over 24 hours. The net had been operating for over 15 hours and were beginning to play out, however, we kept on going throughout that day. As dark approached and no find had been made the decision was made to suspend operation for the night to enable us to hit it again on the next day when the search would be resumed. I hardly remember eating and can only remember the insistant clanging of the telephone and the shaking my wife was giving me around six the next morning. Rusty was on the phone looking for instructions, which I was incapable of giving until after I had held my head under a cold shower. It was apparent to us that through we had provided the link to Wing Control something more was necessary in the rough and wooded terrain at the scene of the accident. In addition, permission was needed from the Canadian Government to establish a fixed station in Canada and permission for a number of the fellows, W1GGW, W1DTK, W1AYX, W1NSK, W-GYJ to operate mobile rigs in Canada. Mr. E. Commeley, the Superintendant of Communications, Department of Transport, Ottawa, Canada provided invaluable assistance in this respect. Within 30 minutes of my call to him he called back with a blanket clearance for us and an appreciated wish for our success.

More Equipment

John, W4DPC/1, came through with the suggestion that was to be our biggest contribution. A local net within a net, 2 meter equipment light enough to move into the wilderness to the actual crash location. Where could we find it? Thank God for Tom, W1NSK, the Civilian Defense Coordinator for Limestone, Maine. Through him we got four Gonset Communicators one of which we installed in a weasel and sent back to the wreckage, where the back breaking job of lifting the fuselage was taking place to permit searchers access to hidden compartments. By this time I had "Cabin Fever" and felt that I should go into the field to help set up the fixed station. Rustys' car had popped two valves by this time and



Rusty, K6MPJ/1 also operated in Canada.

needed repairs, while Johns' car had developed a gas leak around the carburetor. Army personnel set up two 40 foot poles for us and Dan Holser volunteered to run my rig while I went into the field. We set up Rustys' DX-100 and a Gonset Communicator in the back of a GI bus, strung up a doublet between the poles, swiped a small whip off one of the military vehicles, put it on a pole, hooked up the Gonset and were in business. A military generator roared into life giving the necessary power and our signals to the home base jumped considerably.

Operation was again suspended on the night of January 12, 1957, but this time we were able to keep Rustys' portable operation manned during the night for emergencies.

On Sunday, January 13, 1957, the search continued with each reported sightseeing being traced, confirmed and plotted. During this period we got what appeared to be our best clue, an actual sighting confirmed by several people placing the missing man several miles to the south and east of our search area. This sighting placed the missing man amongst some of the most rugged terrain of the area, the Tobuque River Area, a vast expanse of wilderness with no roads or houses. A check with the Border Patrol confirmed our fear of the area. As one Border Patrolman put it, half of our 300 man search party would be lost in the 1st hour and the rest by the end of the second. What to do?

We never had to make that decision though, for as I was dressing to attend the memorial services of my friends, Rusty called in with a positive find. As he was talking I could hear the two meter rig in the background reporting the find of the final body some distance from the wreckage. We dispatched a helicopter to pick up the remains and as I turned off the transmitter and relinquished control of the net to W1GGW, Weldon Martels' wife Polly, I felt that we "Hams" had indeed done something really worthwhile. ■

Danny Weil, VP2VB/P

With the YASME to the End...

This is the concluding installment to the Yasme series. For further information about Danny and the Yasme see the Editorial beginning on page 10.

The Show Must Go On . . . those words continue to flit through my mind, even though my thoughts keep turning to that grim day when all my possessions, ambitions and almost myself were destroyed. Perhaps to some the destruction of an inanimate object would mean just the loss of its actual monetary value, but to a sailor, his ship is his all, and he looks upon her as something money cannot buy. But I must apologize, please forgive me for jumping ahead of my story.

Port Moresby

Port Moresby. I full intended to rest and to tidy up Yasme for her future DXpeditions, but somehow, things just wouldn't go right. The trip (March '57 CQ) from Honiara was a stinker, and the Yasme, whilst being free from actual damages, was a mess below and all her varnish work needed refinishing. I was feeling a bit down, but what with a good anchorage and pleasant surroundings I soon decided it wasn't such a bad life after all. The Port Captain, Captain Hawley, did all in his power to help me obtain a shack. Every house, room, barn and shack was full occupied, and I was beginning to get discouraged when he had a brainwave. Stowed in an old warehouse was the salvage cabin from a ship which had foundered on a reef. Directly it was discovered, a crane was organized to pick it up and drop it at its new QTH about 100 yards from the moorings of Yasme. Power was made available and the rig was set up. I had plenty of assistance to hoist the 40′ steel pole up into vertical, but the fun came when we had to bang in spikes to hold the bracing wires. The ground was solid rock, and whilst we bashed away with a sledge hammer, all that happened was that the spikes bent up. While all this was going on, several of the New Guinea lads forgot to hang onto their guy lines and decided to hold a conference. . . . TIMBER! There was a mad scramble to dodge as it came crashing down. No one hurt, but there was a nasty bend in the pipe . . . a little unsafe for future use. Everyone had a good laugh and up it went again.

By dusk, the beam was up. Coax fixed and rig all loaded up . . . what a relief. Switched on, but all I could hear was noise. I tried hard but the noise level was S9 plus, and the only signal I heard turned out to be VK9DB a few yards from my QTH. Oh brother, what a spot I had landed in to work DX! VK9DB explained that there was a strong copper deposit in the air from the local mines and owing to dry weather and it had settled on every power insulator in the place, causing this infernal noise. Wait for rain? They've never heard of rain here. That put the lid on serious DX'ing.

I decided to round up one of the local lads to give me a hand on fitting out Yasme. With thousands of them around it should present no problem . . . that's what you think. I found a real dyed-in-the-wool New Guinea boy, complete with a great big smile, a big head of fuzzy hair, holes through his nose and ears, betel nut stained teeth and a sad lack of knowledge of the English tongue. With the aid of signs, etc., we finally agreed on a wage, and then came the problem of trying to tell him what I wanted. I painted half the deck before he took up the brush, and then he painted everything else except the deck, including all of my varnish work . . . end of boy No. 1 . . . call the coroner. Had a go with a boy from another tribe. Within two hours he had gouged out a series of long grooves with scraper in my sliding hatch . . . end of boy No. 2. I gave up any thoughts of assistance after that, and very slowly plugged on under my own steam. In that climate, one works for ten minutes and rests for twenty. Varnishing with a bulldozer creating dust nearby resulted in an interesting sandy-beach finish.

I had plenty of opportunity to see around the place, and apart from the heat, it wasn't a bad joint. The town was fitted with all modern inconveniences, and seemed to be doing a roaring trade. Exports consisted mainly of copra, copper and gold . . . I never had a chance to stake a claim . . . the gold in them thar hills was way out in the bush where the cannibals grow and headhunters still thrive. I had no inclination for either free haircuts or to be served as a horse d'oeuvre, so I stayed put.

I spent quite a bit of time with Frank (VK9FN) whilst we played around with the Eldico SSB rig. We had a little trouble with a weak tube, but even that didn't prevent Frank from getting on the air and making quite a few SSB QSOs. The QRN was fighting us all the way and made things really tough.

I was getting a little worried about the weather about then, the North Westerlies were due any time, and it meant that I should have a lousy trip through to Darwin, but I just couldn't leave without my mainsail. It was promised in 15 days and it arrived bang on time . . . *Hard Sails* kept their word and sent a really FB mainsail which fitted like a glove.

Well, fellows, time was creeping on, also the bad weather. The sail was due the following day, and Yasme was ready for sea. I had made the rounds of the town getting all provisions together, and apart from fitting the sail, we were all ready to move off. One morning I opened the door of the Qantas Air Line freight office and there on the floor was big carton with the sail in it. I grabbed the consignment note, cleared it through customs, and in one hour had the sail bent on and hanging from the mast. It fitted perfectly and the set was something that made my eyes glisten.

Customs lost very little time in clearing me to sail. Armed with all the papers I boarded

Yasme, cast off the lines and slowly backed out of the harbor into the open bay. Up went that magnificent new Dacron mainsail and the No. 1 jib, and majestically, Yasme cruised with a light wind the whole length of the sea front showing her paces to an admiring crowd. I was so proud of her as she swept along, the calmwaters only broken by her bows and leaving a faint line of bubbles in her wake. I shouted with exhilaration. Back at sea again, new places, new faces to see . . . no man knows that feeling unless he is a sailor. The wind held steady and Yasme picked up speed until we were skipping along at 7 knots. The sun shone out of a cloudless sky, in fact the whole day was perfect, and we were on our way again. What a day that was for me, no man could have been happier.

spent half an hour trimming the sails so Yasme would steer herself towards Bramble Cay, our next landfall. That afternoon and evening were perfect for sailing. Whilst the seas were big, Yasme sailed over them without a murmur. I was pretty tired, but I stayed in the cockpit until well after midnight just wallowing in the perfect cool of the evening and listening to the soft swish as Yasme parted the waters. Even cooking was no problem, and as I sat there champing away at a T-bone steak I reckoned this was going to be one of the finest trips I had yet made.

Turned in around one that morning and had a perfect night's sleep. At daybreak I got up to check the course and then went back into the cabin for a leisurely breakfast. The weather was perfect and the sea was just gently rolling . . .

For five miles Yasme cruised towards the narrow pass with the sea boiling as it broke upon the vicious reefs on either side. I put on the engine to be safe, but the wind carried her through the dangerous passage and into the open sea . . . the infamous Gulf of Papua where so many ships have been lost on uncharted reefs.

As we cleared the reef the seas turned nasty and Yasme strained and pitched through the choppy water. The wind held steady, and we finally made deep open ocean. I held course for about three hours to get well clear of the reef and then swung round onto course with the wind and seas almost astern. I hoisted the trade wind sails, dropped the mainsail and jib and

what more could I want? The morning sights were taken with a perfect cloudfree sun and horizon, and later, when I crossed them with my noon sight, the whole seven sights worked out within a half mile of each other. It's a wonderful feeling to be miles from land, and with the aid of a sextant and a few tables, to be able to determine one's postion that accurately. I sharpened my pencil and put a little cross on the chart, feeling the richest man in the world. I kept my usual skeds with ZL2GX, and VK9FN, giving them my noon position and my approximate position at that time . . . little did I realize how important that position check would be later that day.

Blissfully unconscious of what the future

might bring, Yasme sailed on her way, never varying more than a degree off course, evening came very suddenly as the sun dropped below the horizon, and with the faint glow lighting up the sky ahead of us, she plowed her way toward destruction.

7:00 p.m. that evening, slight wind, sea calm, no moon, but very cloudy . . . that's the last entry in the log, to my recolletcion. I had just finished my sked with Jock and had left the Onan generator running to give the refrigerator a boost. Built myself a three decker and a pot of coffee, then sat in the cockpit with a book reading by the faint glow of the cockpit light. Everything was peaceful and my thoughts wandered away from my book as I thought of the lands I would see in the future.

Maybe some would say I should have been sitting out on the deck with the binoculars glued to my eyes looking for trouble, or others would have preferred to have me sitting on the cross trees half way up the mast, but from my point of view I reckon I should have been doing exactly what I was doing at that time . . . sitting in the cockpit dreaming. Then I got up and wandered into the cabin, glancing around at all my worldly wealth, the curios that hung on the cabin walls, the little knick knacks I had picked up in odd corners of the globe, all the things that made that cabin into something of a home. As I opened a drawer to look for something there was a horrible grinding sound and I was thrown forward onto the floor. I was stunned. What could have happened so far out in the middle of the ocean?

I tried to convince myself we had hit a piece of drift wood, maybe a whale, anything but that horror of all sailors . . . a reef. Deep in my heart I knew the truth. Yasme had steered herself to her own death and for all I knew mine too.

The silence of before was now changed to a terrific roaring as Yasme forced her way onto the jagged teeth of that reef. The grating and grinding was deafening as her whole weight was forced onto that iron hard rock by the surf breaking right over her. I found myself in the cockpit trying to comprehend what had gone wrong. I knew my sights had been right and I knew the chart hadn't shown a reef, and yet here we were. Maybe it's only a small reef, maybe I shall be able to sail right over it . . . impossible to back off now, and if I drop sail, she will lose all stability and keel over. Start up the engine, force her further on, maybe she will sail into deep water, it can't be a big reef else they would have put it on the chart. It must be a small one they missed. Sure, we'll get off O.K. What am I worrying about, Yasme can take it . . . so can I. In a minute we shall be in deep water with nothing more than a scratch on the keel. No, this is impossible, we just can't be on a reef. I'm dreaming for sure and will wake up in a minute and find it's nothing but an awful nightmare . . . all these thoughts swept through my mind in a fraction of a second. I did start up the engine and try to sail over the reef, but it was a falling tide, and as Yasme gradually fought her way over that rocky path, so the sea, that invincible enemy, gradually dropped away from her. Yasme, losing all buoyancy, came to a shuddering standstill, only rising and falling as an extra big wave came in, lifting her and throwing her back onto the reef, slowly breaking her back.

I thought we might be lucky and get off later when the tide rose so I scrambled over the sloping deck and cast out the anchor. I prayed something would happen, but all my prayers went to nought and gradually she settled firmly on the reef.

Somehow, through all the breaking seas, the tiny Onan generator continued to run without a murmur and the rigs were all fired up. I could hear the boys, sitting in their comfortable shacks, talking away never realizing that one of their clan was at that moment struggling for the life of his ship. I grabbed the mike, trying to be as calm as possible, and called, "SOS, this is the Yacht Yasme on a reef, please clear the frequency." I must have repeated this a dozen times . . . I don't know. When I switched off the transmitter the whole band had gone dead. What had happened? Had the generator stopped—no, the lights were still burning in the cabin. Must be the receiver out! That just couldn't happen to me now. Then I realized that the boys had heard me and were waiting for me to say something more. Danny, for God's sake tell them what has happened. The generator will stop any minute. It has to stop, the Yasme is now heeling at a dangerous angle and the generator will be starved of gas if she goes over further. Somewhere a voice seemed to be calling out "SOS.SOS. Yacht Yasme on a reef—postion, Lat 9° 10″, Long 145° 5″, taking water fast, she won't hold up much longer, for God's sake get a flying boat out to me." . . . Then, somehow, the transmitter was turned off and out of the babble came VK2AUR the strongest signal of all. As the band went quiet again I called him and made a definite contact. Thank God he had heard me; thank God the boys had been listening. All this was a nightmare, but I have the vague recollection of him giving a roger for my QTH, and trying to get hold of Moresby via VK9FN, as well as the police and other rescue sources.

I scrambled back onto the deck where the seas were breaking right over Yasme, forcing her still lower in the water. I had to get my dinghy over the side, get water into it, and the flare pistol. What's happened to the cartridges? They were in my hand, but I didn't know it. The dinghy was lashed on really solid and the knots defied my fumbling fingers. They had tightened up with the spray and the weight

of the dinghy. I tried to break the rope with my bare hands, but it was too tough. Danny . . . for God's sake, calm yourself . . . I tried to talk myself into using a little savvy. I screamed at my own stupidity . . . the knife was hanging from a lanyard around my neck. Suddenly the dinghy was cut loose and dropped straight over the side, upside down.

With my feet braced against the safety lines, I exerted every bit of my fast waning strength in an attempt to turn the dinghy right side up. From somewhere, I developed superhuman strength and slowly pulled it in and turned it right side up. It was full of water, but that didn't matter for I could bail it out later. I cut off a long length of rope, lashed it to the dinghy, and let it drift away from Yasme. There was nothing more I could do on deck so I shot below and tried to raise the boys again. Some one had got Frank on the frequency (I learned later that a friend of mine in Moresby had heard the boys calling Frank on his commercial receiver and had given him a ring.) Frank came on and I gave him my position. "Roger . . . QRX," etc. This business went on and on, and all the time Yasme was taking more water and gradually lying further on to her beam ends. The generator was starting to falter . . . it was only a matter of minutes before I would be completely without communication.

To date, I knew that all of them had my postion and that Frank had been in QSO with the Port Captain in Moresby. Further, a plane was leaving at daybreak for my position, and maybe a rescue boat would set out from somewhere to save me. That was all I knew at that time.

While standing by for further news I went aloft to see what was happening. I gazed around in the half light looking for the dinghy. No sign of it. Where had I tied that rope? Ah, here it is. Must have drifted away out of my vision. I pulled, but I felt no strain, . . . kept pulling, still nothing. I knew the knot hadn't come adrift . . . now what . . . Oh God, as I pulled in the rope, all that was attached to it was the stem of the dinghy. The rest had been crushed to pieces as Yasme had rolled in her death throes . . . my only means of survival was gone! My lifebelt had broken away long before, not that it would have been any use in those shark infested waters . . . what to do now?

I clambered back into the cabin, the water now up to my waist, and found the rig still working O.K. with the generator popping away oblivious to its surroundings and conditions. The band was quiet. Now and again one of the boys would pass a fast message, then dead quiet again. I called Frank for the last and final time, telling him that Yasme had settled completely and the water was around my waist. As I talked the generator started to pop and splutter . . . I knew this was it. The gene faltered, making the lights in the cabin gradually go down as the gene went out. The little Onan gave a last splutter, the lights in the cabin glared for seconds at full brilliance and then everything went quiet and dark. I was at last totally and completely alone. I had started this trip alone, had been alone for two years, and it looked as though I should finish it alone, alone with my beloved ship that had carried me over half way around the world.

I tried the emergency battery lighting and found it still operated even though the batteries had been submerged for some time. Among the debris I found my flashlight which I immediately stuffed into my belt. I found the switch to the mast head light and switched that on to help any aircraft that happened to be around to find me . . . it went out a few minutes later. Though I had sufficient stuff available to make a lifebuoy, it would be of little use. The school of sharks that had been cruising the area earlier wouldn't be far away. My chances in those waters were exactly NIL.

Yasme was tough, but she couldn't take much more of this battering on the reef. Up till now she hadn't been holed, but her planking had started to open up, and my attempts at baling her out with a biscuit tin were useless. The drain pump had stopped when the main engine had become submerged.

By midnight the roar of the surf had quietened with the change of the tide. How fast will it come up and how high? Those two questions bothered me. By this time, the moon had risen and its ghostly glow shone down on us, maybe for the last time. To get my thoughts off my helpless situation I decided to try to get some of the gear out of the cabin whilst the tide was low. The cabin was a nightmare. The floor boards were floating around with mattresses, books, and all sorts of things I had treasured and collected. I struggled just to keep upright as my life floated past me through the cabin door and into the sea. Spools of negatives depicting rare spots in the world, a carved cigarette box presented to me in Ocean Island, two wooden images given me by the chief of one of the native tribes I had met, they all floated past me into oblivion. The sea is cruel.

I tore my thoughts away from those things and back to the job at hand: get that radio gear out, that was the most important of all. Ah, there is the 500 Eldico linear amplifier, still high and dry on the port side. Can I get it out? The SSB-100 is alongside it . . . maybe I can get that out too. If the rescue boat gets here soon maybe I will be able to save it all. Carrying that 500 is no easy matter, even on an even keel, but to carry it with the deck at a 45 degree angle and the water surging hard against me was difficult. I got it off the shelf and gingerly edged my way towards the cabin door. Inch by inch I moved, my whole body tense with the strain of carrying that heavy

weight at such an awkward angle. Suddenly there was a crash outside as a massive wave struck Yasme and there I am under water with the 500 lying across my chest.

I struggled to get that weight off my chest, but pieces of wood, clothing and blankets tangled me up and held me down. It had been so sudden I hadn't a chance to take a deep breath before I was submerged and my lungs were bursting. Drowned in 5′ of water in the middle of the Papuan Gulf! Here I was being drowned by the very thing I was trying to save. I could see the funny side of it all, even under those circumstances, and my mind rejected the thoughts of drowning. It made me mad to think I had tried to save the gear, and in my clumsiness, had completely ruined it. I tried to think of how to save it if I were able to get it back to the surface. Silly thoughts, but when one is nearing the end, funny things happen to one's mind.

Suddenly I managed to roll over and I was clear! I gulped the air that was left in the fast filling cabin. The tide was rising fast now and there was only about a foot of air space left between the water and the cabin roof. Well, I'm going to have a go at the SSB-100 . . . I'm determined to work SSB even it it kills me. All thoughts of the rising tide were gone as I struggled with that rig out through the cabin door. Somehow I kept it at the level of my head all the way out into the cockpit and with a final push managed to get it onto the top deck. Now for the Collins and Viking.

These rigs were in the after cabin where I had a little more room to move, but all the time the tide was rising faster, and my chances of getting it out were becoming less and less. No time to unscrew coax connectors, no time to unscrew ground leads or power wires, rip it out anyway and get it away from the fast rising water. First, out came the Collins, then the Viking, and for good measure, just to show no ill feeling, the speaker, VFO and monitor. I looked for the bug, but that had disappeared in the water then 7′ deep in the cabin. It was too late to get the Elmac, that faithful little TX that had served me well right from the start of the expedition, and the Hammarlund had long since been submerged and had gone QRY. A feeling of elation came over me when I realized how much of the gear I had salvaged. Not one piece of it had been damaged, not even splashed.

The tide gradually enveloped the lower parts of Yasme, climbing slowly and inexorably. I built a scaffolding atop the cabin with odd booms and pieces of wood lashed with rope and laboriously piled all the gear high and dry, and still that tide rose. When would it stop? It had to stop some time, but when? I gazed at the chronometer which ticked away the minutes towards my doom and realized that daybreak was only an hour away. Would they find me? That was the all prevailing question in my mind. Having flown for many years, I knew how hard it was to sight a tiny object in the sea, and as Yasme gradually became completely submerged, I knew my chances of being sighted were greatly diminished. The water was now lapping around my rickety scaffolding so I tried to raise it more, but by then my strength was nearly gone and the effort to carry even my own weight tired me quickly. The platform was too rickety to carry my weight, and I still hoped that a rescue launch would arrive and save everything, but as dawn broke I scanned the sea and skies for a sight of boat or aircraft without any luck.

6:00 a.m. . . . 7:00 a.m., still nothing in sight, but now the tide had completely covered Yasme and all that was visible was the mast and my funny little platform sticking above the water. The mast had become unstayed and I knew it wouldn't last very long, but it seemed to be the last resort, so with aching muscles, I waded across the submerged cabin and clung to the base of the mast. Lack of fresh water was beginning to make me dizzy, and as the sun became hotter I tried to shelter behind the slender mast to catch its meager shade, but it was no help at all. My imagination was playing all sorts of tricks . . . I could have sworn that a shark came out of the cabin of Yasme. My eyelids, encrusted with salt, blurred everything. I knuckled my eyes with my free hand and I looked again. Yes, there they were, three of them circling Yasme, just waiting for the inevitable. I was determined to put up a fight, though armed only with a pitifully small clasp knife.

Nothing to do except wait. Would a boat or plane ever arrive? The chances of seeing me were one in a million; I had no false illusions about my present position, but still couldn't believe this was the end. I had long since given up staring into the sky. My eyes were aching and stinging, my whole body felt like lead, and it took every ounce of my strength just to cling to the mast.

The continual roar of the breaking surf began to sound like the drone of a plane. Just as a man in the desert sees mirages I kept seeing imaginary airplanes coming. Then there came a slightly different tone. I could swear it was a different tone. A plane should come from the east. I lifted my head slowly and shielded my eyes, but the strain was too much, all I could see were spots jumping around like miniature demons.

It must be an airplane . . . looking to the west, not believing my blurred eyesight, I saw a faint speck making a circle far out to the north west, heading towards Yasme. The roar of his engines increased until it blotted out all sound from that dreaded reef. The roar rose in pitch until it became a scream as he swooped low over Yasme. It faded away into the distance and the reef took over the sound effects.

I cried with relief and the clusters of salt around my eyes greedily sucked up the drops of moisture and made my eyes ache even more.

I waved to the pilot as he circled, but even that was too much strain, and after a minute I just hung there waiting. Twice more he circled very low and as my eye caught the plane I noticed a signal lamp flashing. What on earth was he trying to tell me? Come to that, what the heck could he tell me that could be of any use? I have never been much at reading a blinker under perfect conditions, but to read one going about 120 mph in a fast circle, sometimes being blotted out with the sun and other times by the plane itself, and with eyes that can hardly see; couple all this together with a very foggy brain and you will see what I was attempting. How many times he circled I shall never know, but finally it penetrated that a rescue launch was on its way and should arrive about 4:00 p.m. that afternoon.

This started me laughing. It was now just after 8:00 a.m. and that meant I would have to stay there for another 8 hours. A rising tide, no water, no strength, a handhold which was likely to disappear any moment and a school of sharks waiting below . . . yes, this was very funny. I gave them a few waves to say I understood . . . they circled once more and headed east. As they disappeared all my chances of survival went with them, for I knew that I could never last for another 8 hours. By then I didn't care anymore; I became like a statue attached to the mast, never moving, with my eyes closed . . . just waiting.

The roar of the surf became a lullaby. I felt myself falling asleep and had to mentally shake myself back to consciousness. I just couldn't fall asleep now. There was still a chance if I could hang on, but absolutely none if I should fall asleep and drop into the drink . . . the sharks would see to that.

Later, maybe around 10:00 a.m., another faint drone. Could the plane have come back? No, that was impossible. I reckoned out his speed plus the time for refueling and realized it would have been impossible to have the return trip in such a short time. Imagination, that's what it was. By gosh, the roar that almost burst my eardrums a few seconds later was no imagination. The terrific scream of engines and a semi-gale wind knocked all ideas of sleep, drowning, and sharks right out of my mind. My head snapped up with a click, my eyes unglued themselves from thick layers of encrusted salt, and there soaring high in the sky was a R.A.A.F. 4 engined Lincoln Bomber. That old feeling of exhilaration came back and I screwed myself round on the mast to gaze with wonderment at this new visitor

But . . . and I had to look again to be sure . . . it was a *land plane*. What use could he be? Impossible! A seaplane, a helicopter . . . these things I could understand, but not a land plane. He circled Yasme, sometimes very low, then climbing quite high. He seemed to taunt me . . . these things I imagined in my twisted brain . . . sometimes he would climb into the sky and disappear into the blue, then, from nowhere, he would scream down as though on a bombing run. My thoughts went back to my old days in the RAF with the old Wellington Bombers . . . all sorts of things passed through my mind as he continually circled and dived around my solitary position.

Then it came to me . . . these dummy runs were for a good reason. He swept away into the distance and then almost touching the waves he came towards Yasme. The low drone of his engines built up to an ear-shattering roar. Something fell from his bomb bays and hit the water. Thank God . . . it's a dinghy! It gradually took form as its tiny cylinder of CO_2 inflated it to full size, and there, floating towards me was my life saver

Slowly, so very slowly, that dinghy floated nearer. I swore with anguish whenever a little puff of wind would take it away. Closer and closer it came, but not in a straight line. I knew then it would drift past my starboard hand. The currents had got hold of it and were taking it from my reach. Now it was almost level with Yasme, but so far away. My eyes automatically looked along the submerged length of Yasme for a heaving line, something I could throw out to maybe hook onto it, but there was nothing to be seen, only water knee deep over the hull. I had only seconds in which to make up my mind. The decision had to be made quickly. To stay aboard Yasme until the mast broke when I should surely be in the soup, or to swim to the dinghy and risk the sharks. What would *you do?*

The mast might last a minute or several hours, I didn't know, but when it did go I would go with it. The dinghy was now 100 yards away, with every second taking it further from my grasp. I stood a chance of making it if I had the strength to swim that distance . . . but could I?

My brain started running in high gear and it occurred to me that the noise of the aircraft might have scared the sharks away. With a prayer in my heart I lowered myself into the water to avoid splashing and slowly swam towards the dinghy. I swam slowly in a breast stroke, forcing myself to keep calm and not to splash too much. Gradually, the dinghy took shape as I neared it, that orange colored balloon bobbing about on the water. Only 12 feet more and my whole body was screaming to make a wild burst towards it . . . anything to get aboard it in the minimum time. I just had to go slow. The next few minutes seemed like hours and then the dinghy was within hand's reach. Plastered in great black letters were the following words, "LADDER ON OTHER SIDE" . . . this was funny, it would be just my luck

to have a shark pop up just as I swam to the other side for that damned ladder.

To hell with the ladder . . . I'd had enough, I'm not chancing another 10 feet in this water just to make my entry into the dinghy an easy one. I grabbed a cord along the top edge of the dinghy and with my last available strength pulled myself over the side with one big heave. As I swung into the boat I heard a swish and a thud. This was followed by the sharp explosion of one of the sections of the dinghy deflating as a shark missed my foot and tore a chunk out of it. The other airtight compartments kept it afloat. Saved at last . . . thank God. I looked around and there were a dozen sharks thrashing through the water circling me.

Well, no time to look at the scenery, the thing now was to paddle back to the Yasme to rescue the rigs which were still high and dry. Lying in the bottom of the dinghy were two very tiny canvas hand paddles. They seemed inadequate, but were better than nothing. I slipped them on, I leaned through the entrance, my stomach on the edge of the dinghy, and started to paddle toward Yasme's mast sticking up in the distance.

The current was quite strong and I was weak, so weak that after 5 minutes I fell back into the dinghy to rest. What irony, all that gear so near and no strength to reach it. I just had to get there, regardless of the cost. No one will ever know how I struggled and worked to reach Yasme, but I felt that fate had done its part and wanted nothing more to do with me. For every yard I made headway the current pushed me back half as much again . . . I was fighting a losing battle. How long I tried I don't know, but later I remember waking up in the dinghy shivering with cold even though the sun was burning down with all its afternoon intensity. Looking through the entrances at both ends I failed to sight Yasme's mast again, so I must have drifted miles in that coma.

Something must have woken me. It was then that I realized that the Lincoln was still around. I looked up and saw her keeping a close watch on me. I leaned out and gave them a wave, then shortly afterwards they made another swoop on the dinghy. What now? Another package dropped from the plane and whilst it was close, I didn't have the strength to paddle for it. Slowly those supplies of water and food drifted away . . . so near yet so far, but it was useless for me to try to reach them. The pilot, seeing my difficulty, made several more dummy runs and dropped another load of gear . . . I learned afterwards that it was a miniature radio transmitter, food and medical supplies. This one came within inches of my grasp and I still couldn't reach it. I was too tired to even swear.

The Lincoln had to my knowledge, or as far as I could reckon, been cruising around for some several hours, and unless he was equipped with overload tanks I knew he would have to soon return to base for refueling. My supposition was correct as shortly afterwards he made several runs along side the dinghy and dropped smoke markers; then, with the typical salute and dip, he flew into the southwest out of sight. I relapsed into a semi-coma not caring very much, my mind a blank. My tongue had swollen to twice its normal size and my lips were covered in blisters, but none of this seemed to worry me. I was content where I was. No more fears of mast breaking, no thoughts of big seas washing me off the deck, no bothers about sharks . . . I slept.

Hours later, around 4.30 p.m. that afternoon, I awoke shivering, lying in a pool of water in the dinghy, and looked out. There was a Catalina Seaplane from Qantas Airways. I gave a wave and saw the pilot return it. I suddenly realized that the sea had started to build up. It had been quite calm a few hours ago with little wind, but now the seas were so ugly that I didn't see how the pilot could land. He swept away into the distance, then turned . . . he was trying a landing!

Once, twice he bounced, then gradually came to a stop with engines ticking over. A few minutes in that position, then with throttles opened he swung around to my direction and slowly made headway through the rough sea. What a pilot! He did a magnificent job, and all my worries disappeared as he closed with the dinghy.

Danny, after his rescue.

His props were gleaming as they came nearer, then, with a few chuffs his port engine stopped as the dinghy came along the port side. Willing hands lifted me into the bow cockpit. As the port engine burst back into life preparatory to take off I glanced through the blister and saw my dinghy drifting slowly astern. The pilot was already making towards the lee of the reef for his take off. We bounced all over the place, made the position for take off, then came around into wind, and with hardly a bump became airborne. Below me the reef stood out in the deep blue sea as we circled Yasme's grave.

The Last of Yasme

I saw that her mast had broken and was floating on the water. My little platform had vanished . . . all that wonderful gear was gone and Yasme under at least 6 feet of water . . . I realized that had I decided to stay I should have been finished. Twice we circled Yasme, then the pilot appreciating my feelings, gave her a salute, swung his ship east and headed for Port Moresby.

I have very little recollection of the return trip except that the crew gave me food and drink and talked to me. We landed around 5:30 p.m. and took a launch to shore. Reporters were there by the thousands, or so it appeared to me . . . all asking damn fool questions which I answered in an automatic way, not even knowing what I said. Out of this chaos of news hounds two friends came . . . Frank VK9FN and Don Etheridge from the Red Cross. Don very quickly grabbed me from the rest of the crowd and whisked me off to his home. Both he and his wife were kindness personified. A hot shower, food and clothing, then sleep until the following day.

I won't go into the details of how I searched Port Moresby for some one to assist me in the salvage of Yasme. Everywhere I went, the same query . . . "Is she insured?" The answer was obviously NO . . . I could never afford the premium for that . . . even were a company prepared to take me on. The results were all the same . . . no one wanted to go out . . . they didn't have the time, etc., etc. which left me exactly where I was.

I realized that to stay in Moresby would be a dead loss after the refusals to salvage Yasme. I had no money, only the clothes which had been supplied by the Red Cross. I saw Don Etheridge again and told him my position, that if I could get to Sydney, maybe I could get something organized there. Within half an hour, he returned to the hotel and presented me with a plane ticket to Sydney . . . with compliments of the RED CROSS representative. The Red Cross chap had everything organized to put me up with food, bed, etc. Once in Sydney VK2ASZ, Art decided it would be a better idea if I went off to his QTH.

It was grand to be with one of the boys whom I had QSO'd so much but had never seen, and there we were chewing the fat. Naturally, we were disturbed every few moments with the fone ringing, but I had become used to it. Stayed with Art for a couple of days, then VK2ADV, Mac, took over and made me his guest. Seemed to me these boys couldn't do enough for me, so I was sure glad I had managed to reach Sydney.

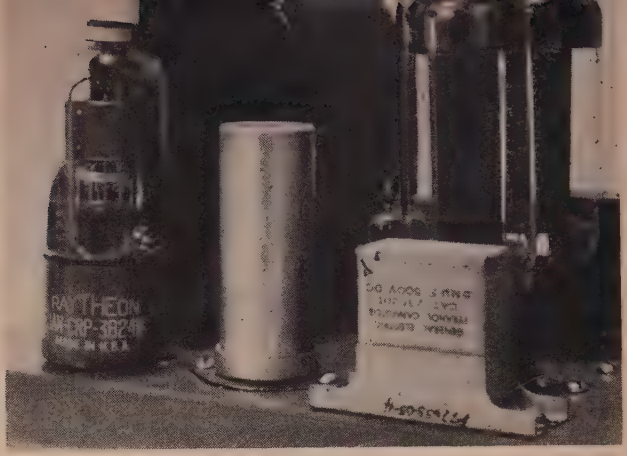
Mac did all he could to make me comfortable as did Art. We spent many hours chasing around the clubs to find another boat, but no luck . . . there just wasn't a boat for sale that would suit my purpose. I appeared on the local television show, and gave a talk over the radio . . . all for free, but even that didn't help me in my quest for a boat, so after a long discussion with Mac and Dick KV4AA I decided to return to the states and see what I could do up there. If I am successful in finding a boat there it will mean crossing the Pacific again, but also it will give me a chance to call at some of the rare spots I missed on the last trip such as the Kermadecs and Wallis Island . . . maybe you boys will think out a few new ones for me, anyway, that is all for the future, and I have come to the conclusion that none of us can be sure of the future.

Conclusion

Well, fellers, not much more I can say now. I expect I have missed lots of little interesting items out of this story, but when one has lost all his notes, his log and is still a bit fuzzy in the brain box, it's tough to remember everything, so, please forgive me if I have missed out a few details . . . cheerio for now . . . Danny. ■

Bob, K6LCO explains Eimac 4CX5000 to Danny while visiting the Eimac plant after arriving in the U.S.

The Use and Abuse of Electrolytic Capacitors



Incorrect placement of an electrolytic capacitor which resulted in repeated breakdown.

Daniel Peters
4012 Ave. S
Brooklyn 34, N. Y.

Electrolytic capacitors provide more capacitance in a given space and at a lower cost per micro-farad than any other kind. However, like many bargains, something is sacrificed and we find that electrolytics are quite temperature shy.

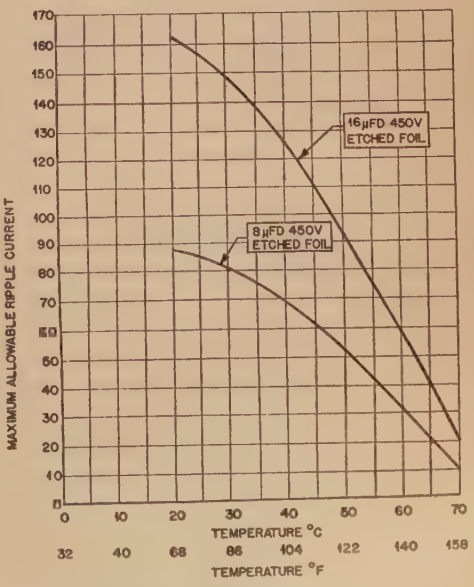
That which follows is being written in the hope that some of you may benefit by the mistake made by the author.

The photo shows a corner of a power supply constructed by the author a few years ago. Within the first year of operation the electrolytic capacitor was replaced three times. After sufficiently cursing the capacitor manufacturers for not making capacitors like "in the good old days" I decided to determine the cause of the trouble. A burnt finger and a thermometer showed the capacitor operating at a temperature in excess of 95°C. Catalog data showed maximum temperature for this capacitor as 85°C. In an attempt to find a capacitor with a higher temperature rating, it was found that most commercially available electrolytics have maximum operating temperatures of between 60°C and 85°C.

As you can see from the photograph this capacitor overheated because it was sandwiched between two heat producing rectifiers. Interchanging the capacitor and the 3B24 has lowered the temperature to within limits and eliminated further trouble. The moral of this story is simple, "Keep them cool."

Operating temperatures become particularly important for input-filter capacitors because the allowable ripple current decreases with temperature. The chart shows ripple current rating versus temperature for two typical etched-aluminum foil dry electrolytics. The marked effect of temperature upon maximum allowable ripple current is evident. When building equipment using more than one power supply remember that only one of the units of a multi-section electrolytic is normally intended for use as the input filter. Check with manufacturers catalogs to be sure.

Temperature change also causes marked changes in capacitance of electrolytic capacitors. The capacitance decreases with a decrease in temperature. One etched foil type has only 43% of its rated capacity at 20°C. When equipment is located in low temperature surroundings it is wise to use more capacitance than normally needed. Doing so will prevent feed-back and the other difficulties which arise from insufficient filtering when the mercury begins to fall. ■

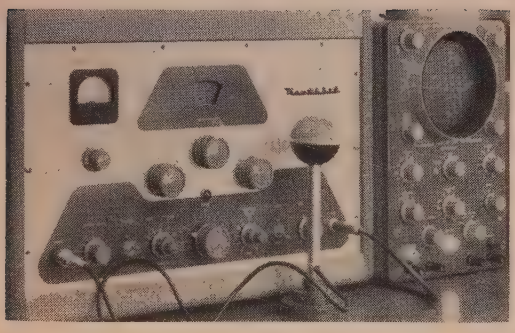


Ripple current rating versus temperature

Featuring voice control and receiver silencing circuits this universal adaptor will work with just about any transmitter in the medium power bracket.

Double Sideband With the Heath DX-100

Donald L. Stoner
Engineering Consultant
P. O. Box 137
Ontario, California



It begins to appear that the subject of double sideband, suppressed carrier transmission is going to create even more controversy than single sideband. The AM "diehards" don't like it because "it still sounds like single sideband to me", and the "sidewinders" do not like it either for, "it takes up twice as much room". I recently had the pleasure of talking to the Santa Barbara Radio Club about this mode of transmission, and little groups were still standing around gesturing wildly when I left at 11 p.m. Most of them were SSB operators.

The discussion brought out the mis-conceptions that appear to have gotten started about double sideband. It does not take a special receiver to tune in double sideband stations. Any receiver that is capable of receiving SSB transmissions will work fine on DSB. While testing a DX-100 converted to DSB on 75 meters, I contacted stations with receivers ranging from surplus to Collins 75A4's. All reported satisfactory reception. Again and again, I was able to break into round-tables without anyone being the wiser. (Actually, I made quite a pest of myself while testing the adapter on the low end of 75.) Since the stations were only receiving one sideband, it sounded the same to them. Then someone would switch to the other sideband and start calling me frantically. "W6TNS— W6TNS, better get that thing off the air, your sideband suppression has gone to pot". Explanations of what I was doing brought interested questions, usually. Occasionally, it brought the conversation to an end! All kidding aside, the SSB operators were not really hostile. They pointed out that DSB has several advantages. First and possibly most important, it eliminates the carrier. The carrier is the biggest troublemaker we have to contend with on the amateur bands, bar none! This "monster" is responsible for all the squawks and whistles that usually spoil a QSO. Elimination of the carrier is the first step in the right direction. Another advantage is that voice control can be utilized to reduce transmission time to a minimum thereby reducing QRM. Sideband also reduces the duty cycle on the final amplifiers and power supplies permitting more power out per dollar invested. 1300 volts, and more, is not uncommon on "low power" tubes such as 6146's and 807's.

Another mis-conception is associated with the balanced modulator circuit shown in fig 1. When this circuit is used on double sideband, we gain a power advantage because the carrier power can now be used in the sidebands. However, since a balanced modulator is simply an electronic switch, only one tube is working at any one time. Because of this, if the plates were amplitude modulated with B-plus on the screens the power output would be the same as if the stage were operated as a DSB balanced modulator. Actually, the power advantage is lost by using a high level balanced modulator. Of course the balanced modulator can be loaded heavier and more plate voltage applied, but all other things being equal the power output of the two amplifiers is the same.

The DX-100

Two possible methods of changing the DX-100 suggested themselves. I might change the final grid or plate circuits to push-pull, thereby making it a balanced modulator or I might build a small balanced modulator to operate external to the rig and run the final as a linear.

Looking over the DX-100 brought several

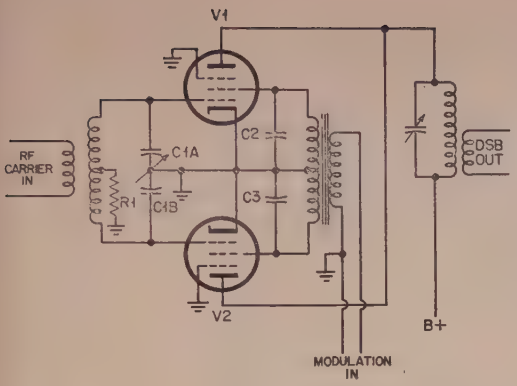


Fig 1. A typical balanced modulator circuit for use at high and low r-f levels.

very interesting factors to light. Converting the final amplifier to push-pull grids involved a major reconstruction job. Leaving the grids the way they were and converting the plate tank to push-pull was out for the same reason. In thinking the problem over, I kept coming back to the obvious fact that in a high level balanced modulator only one tube at a time is working. If both tubes could be made to work at the same time then twice the power could be had. The solution lay in operating the final as a linear and inserting the DSB adaptor (balanced modulator) between the buffer and final amplifier.

A careful study of the circuit showed that the final received two types of bias. First from the bias supply, providing fixed or protective bias. Second, from the application of r.f. It so happens that when the r.f. is removed the fixed bias is close to the amount necessary to operate the 6146's linear. In fact, with no drive to the final, adjustment of the clamp tube to where the plate meter reads 50 ma. places the final in a linear condition since the grid does not draw current, the grid voltage doesn't change, hence the clamp tube wouldn't affect performance. Oh boy! this was it. A couple of miniature tubes between the buffer and final and I would have a 200 watt sideband transmitter. This system would also reduce the TVI that might get out of the transmitter without a low pass filter in use.

Additional Advantages

This type of adaptor can be used to sideband the Johnson Viking, Collins 32-V and B&W as well as any single ended transmitter. Just make sure the final is linear when using the adaptor.

The DX-100 Adaptor

The DSB adaptor for the DX-100 is shown as *fig 2*. When operating on SB the modulators are not used. Audio for modulating the adapter is taken from the speech amplifier. When operating AM the modulators are switched back into operation and the final amplifier is automatically biased to class C by the drive from the buffer stage. In operation r.f. from the DX-100 is connected to J1 and then to the balanced modulators (V1 & 2). Capacitor C2 acts as a balance control for the two tubes. The balanced output is combined in the plate circuit and fed back to the 6146's in the DX-100, via J2. A switch in the screen circuit (S2a) applies B plus voltage to the screens on calibrate (pos. #1), on AM manual (pos. #4), and on AM voice control (pos. #3). Switch S2b applies audio to the balanced modulator screens in the DSB positions. A third section of the same switch turns the DX-100 driver on for frequency spotting and tune-up.

Voice control is accomplished by rectifying a small portion of the modulating voltage in V4b. Control R10 acts to set the trip level and relay hold in time. Relay tube (V3b) is biased to cutoff by resistors R12 and R13. However, when the positive d-c from V4b is applied to the control grid of V3b, the sensitive relay K-1 will trip. This in turn trips relay K2 which turns on the driver and final in the DX-100. Resistor R14 causes current to flow in relay when the front panel switch is turned on for manual operation.

To prevent audio from the speaker, from turning on the transmitter, a small portion is applied to V3a from the speaker matching transformer, T2. This voltage is amplified and rectified in V4a, ½ of a 6AL5. This section of the rectifier produces negative voltage which counteracts the positive voltage created by the voice control circuits.

A filament transformer is included to avoid overburdening the DX-100 filament supply. Note that the filament connections on the 12BY7's are not the same as those of the 12AT7. Plug PL-1 connects to a cable that plugs into the accessory socket on the rear apron of the DX-100. This cable brings all the necessary connections to the adapter, with the exception of the r.f.

Converting the DX-100

Conversion of the DX-100 is simplicity itself. The hardest part is the installation of the coax connectors on the rear apron. Let's do that first. To start, clip the connection between feedthrough insulator and the 6146 grid r.f. choke (Be careful not to damage the choke). Next, drill two ⅝ inch holes behind the 6146's between the rear apron lip and the 6146 subassembly. It may be necessary to file the edge of the connector flange, for it is an extremely close fit. UG-88/U style connectors will work equally as well and mount somewhat easier. Use these, if available. Remove the 47 mmf capacitor that is connected between the grid wire and the ground wire. Extend the ground wire and solder it to the two coax connectors. Connect the center pin of the connector near-

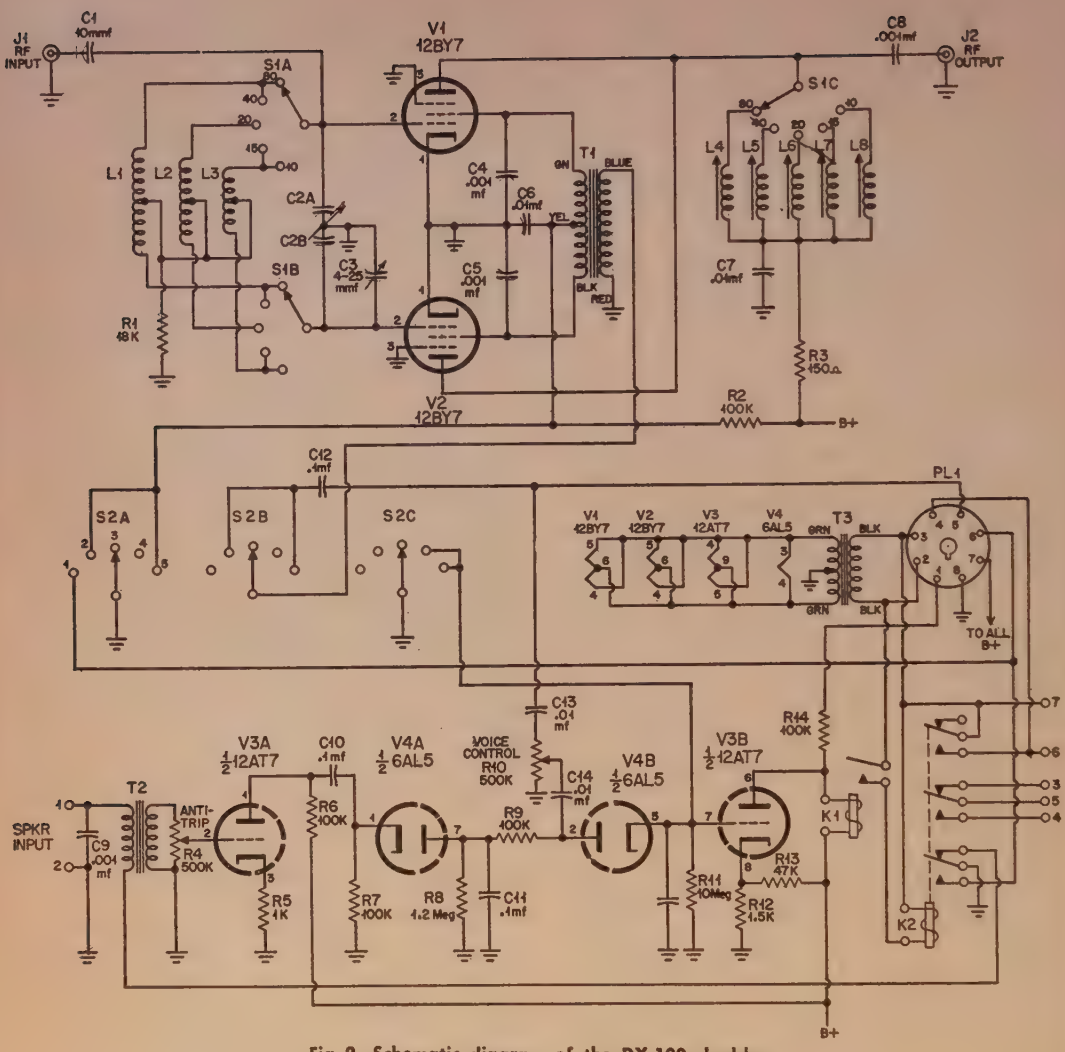


Fig 2. Schematic diagram of the DX-100 double sideband, suppressed carrier adapter. The circles numbered one through seven refer to terminals on the Kulka terminal strip. Terminals six and seven are used for the antenna relay.

Miscellaneous parts:

8 lug barrier terminal strip. 5 x 9½ x 2½ inch chassis (California Chassis A-102) 8 pin plug (Amphenol 86-CP8) 2 foot length of 8 wire cable and connectors (amphenol 78-PF8 and 86-PM8) 3 each 9 pin sockets and one 7 pin socket.

DX-100 adapter parts list

S2—3 pole, 5 position miniature switch (Centralab PA-2007)

T1—Interstage plate to P-P grids (Triad A-31X)

T2—Plate to speaker matching transformer (S-3X)

T3—Filament transformer 110 volts to 6.3 @ 1.2 amps. (Triad F-14X)k

C1—10 mmf disc or silver mica

C2a, b—Dual 365 mmf capacitor (Miller #2112)

C3—25 mmf rotary trimmer (use if padding capacity on C2 is insufficient)

C4, C5, C8, C9—.001 mf 600 volt disc ceramic

C6, C7, C13, C14—.01 mf 600 volt paper

C10, C11, C15—.1 mf 400 volt paper

C12—.1 mf 600 volt paper

J1, J2—Amphenol UHF style connector

K1—Sensitive relay — 5000 ohms (Sigma 4F)

K2—110 volt a-c 3 pole relay (Advance MG/3C/115 va

L1—64 turns #24 5/8" dia 2" long centertapped, AirDux #532

L2—14 turns #20 5/8" dia 7/8" long centertapped, AirDux #516

L3—8 turns #16 1/2" dia 1/2" long centertapped, AirDux #416

L4—14.8—31 uh. (Miller #4407)

L5—6.7—15 uh. (Miller #4406)

L6—3.1—6.8 uh. (Miller #4405)

L7—1.5—3.2 uh. (Miller #4404)

L8—0.9—1.6 uh. (Miller #4403)

R1—18K, 2 watt

R2—100K, 2 watt

R3—150 ohms, 1/2 watt

R4—R10—500K audio taper pot. (Centralab B-60)

R5—1K, 1/2 watt

R6, R7, R9—100K, 1/2 watt

R8—1.2M, 1/2 watt

R11—10M, 1/2 watt

R12—1.5k, 1/2 watt

R13—47K, 1 watt

R14—100K, 1 watt

S1—3 pole—5 position wafer switch (Three Centralab X switch sections and P-122 index)

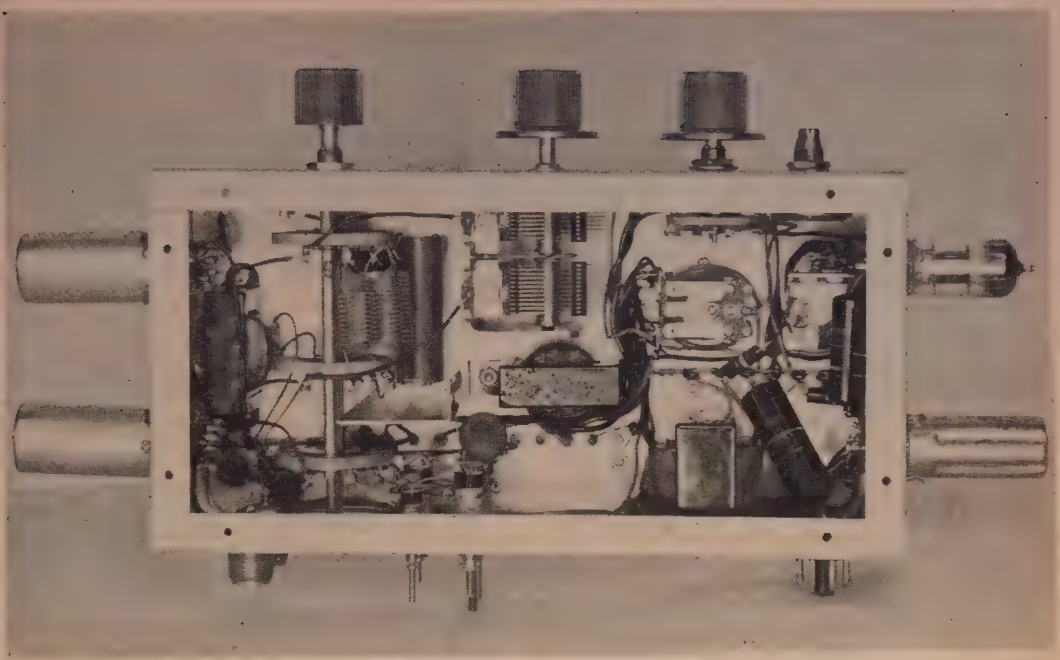


Fig 5. Inside view of the DX-100 adapter. Note the use of tube shields and the plate separating the balanced modulator coils.

est the chassis to the grid wire with a short straight wire. From the other connector, connect a straight length of RG-59/U coaxial cable to the feedthrough insulator. Make good ground connections at each end of the cable to prevent feed-through. This completes the modifications to the 6146's. As a test, connect an 18 inch piece of RG-59/U between the connectors, with mating connectors at each end of the cable. The capacity of this length of cable (approx. 40 mmf) replaces the 47 mmf capacitor and the DX-100 will tune and operate exactly the same as before.

Now let's supply power to the adapter chassis. To avoid drilling any more holes in the rear apron of the DX-100 the present accessory socket can be used. Pin 5 of this socket is empty. Between this point and pin 7 of the 12BY7 speech amplifier connect a length of shielded cable. Ground securely at both ends. It is a little difficult to gain access to the plate pin, but with long nose pliers and a solder gun, it is possible. Pins 6 and 7 of the remote control socket are used with an external modulator. Since we are not concerned with such old fashioned methods of modulating a transmitter, these two wires can be used with the adapter. Locate the other end of the blue wire that connects to pin 7 of the remote control socket (terminal strip G G) and jumper this wire to pin 5 of the 5V4 (B plus tie point). Locate the connection on terminal strip H H that connects to pin 6 of the remote control socket. From this point on the terminal strip, connect a wire to pin 9 of the PHONE-CW switch (N). Last, but not least, spread the shorting prong on key jack O, so that it is no longer a shorting type jack. This completes the modifications to the DX-100. The transmitter will operate exactly the same as before except it is necessary to have a closed key plugged into the jack when checking frequency on c.w.

To check your progress so far, connect the 18 inch coax cable used before to the coax connectors. Switch to 75 and turn up the transmitter normally (drive, final, loading etc.). Now, switch off the final and turn the clamp potentiometer full counter clockwise and remove the 18 inch jumper cable. Turn on the final and *slowly* rotate the clamp adjust control clockwise until the plate meter reads exactly 50 ma. To check for instability, rotate the amplifier tuning knob while observing the plate current. There should be absolutely no movement of the meter, indicating that no r-f is leaking through to the final. A sudden upswing of the meter indicates parasitics. If this should be encountered, a small parasitic choke (similar to that in the 6146 plate circuit) connected between the r-f input connector and the 6146 grids (rather than the wire) will cure it.

Constructing the Adapter

The adapter mounted in its operating position is shown in *fig 3*. Mounting the chassis on the rear panel of the DX-100 is necessary so that the r-f input cable will be short. Since the grid circuit for the 6146's is located inside the adapter chassis, the distance between it and the final should be kept extremely short. The two 12BY7 balanced modulator tubes are

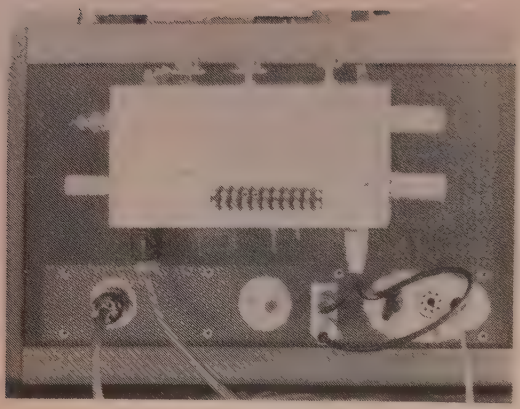


Fig 3. The Double Sideband adapter mounted on the rear of the DX-100 cabinet. The knob and socket are for a VHF adapter that will be described in a future issue.

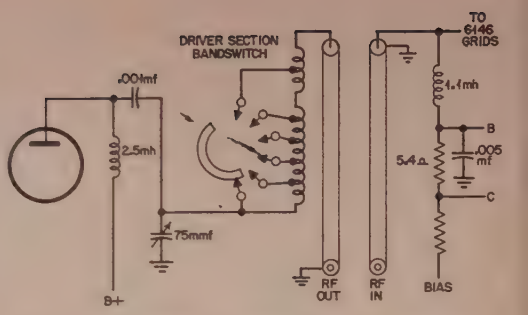


Fig 4. The 6146 grid circuitry after the modifications described in the text

mounted on the side of the chassis above the connectors. Across the back of the chassis a Kulka terminal strip was mounted for connecting to the antenna relay, receiver speaker. In addition, the spare relay contacts were connected to this strip for operating additional circuits such as on the air lights etc. At the left side of the bottom of the chassis, an 8 pin plug was mounted for the power cable. The voice control tubes were mounted on the left end of the chassis.

Fig 4 shows the interior construction of the adapter chassis. A dual 365 mmf variable capacitor is used for the balanced modulator tuning capacitor. To the left of this capacitor the band switch is located. The transformer between the 12BY7's is the driver transformer. T1. The filament transformer can be found in the lower right hand corner of the chassis and the speaker matching transformer is approximately in the center of the chassis. A small aluminum shield plate was mounted between the balanced modulator grid coil and the plate tank coil to minimize the r-f feed through. Front panel controls include the band switch, carrier balance, function switch, voice control trip level and the anti-trip level control.

The adapter was constructed by drilling all holes, wiring the balanced modulator circuitry next, then the front panel controls and the voice control circuitry and the relays. No chassis layout is given for the photos are almost self explanatory. No difficulty should develop duplicating the unit if the same general layout is used.

Adjusting the Adapter

In addition to the 18 inch cable you made earlier, prepare a 5 inch piece of RG-59/U to connect the output of the adapter to the input of the DX-100. The 18 inch length will be used to connect the r-f out of the DX-100 to the input of the adapter. Set the DX-100 on 75 meters, tune the DRIVER knob to its usual position for 75 and turn up the excitation control to its normal setting. Tune the balanced modulator grid and plate coils for maximum grid drive. (not to exceed 8 ma.!) Now, switch from position 1 (tune up) to position 2 (DSB—voice control). Carefully adjust the balanced modulator tuning for a sudden dip in the grid current. Since the balanced modulators are level sensitive, it may be necessary to adjust the drive up or down to obtain a null in the carrier. To obtain the exact center of the null, use the receiver "S" meter or turn on the final amplifier and adjust for minimum plate current. Turn off the final amplifier and touch a neon bulb to the r-f output jack on the adapter. The bulb should not light until you turn up the AUDIO GAIN control on the DX-100 and whistle into the microphone. This should cause the lamp to glow and if you talk loud enough, the meter on the front panel of the DX-100 will indicate grid current flow. Incidentally, the 12AT7 tube should be removed from the adapter so that the final will not be turned on. (Now I tell you, after you have been electrocuted!).

The 6146's are to be used as linear amplifiers and therefore, an oscilloscope should be coupled near the dummy load during the following steps. The Heath OL-1 makes a fine scope for this purpose because of its small size. The vertical deflection jack at the rear of the scope should be coupled near the dummy load for r-f pickup. The Heath O-11 also makes an excellent scope for checking 75 meter DSB equipment for low level r-f energy can be fed through the scope amplifiers because of the wide band response. Since the DX-100 uses a combination of fixed bias and signal bias for the 6146 control grids, it is not necessary to change the biasing circuit. The normal fixed bias runs around 60 volts which is only slightly high for class AB_1 operation. However, because of the 2.2K resistor in series with the bias supply, the 6146's should never be allowed to draw grid

current. This will develop an additional bias voltage which makes the stage very non-linear. Connect an audio oscillator to the mike jack (or whistle, if you have a steady whistler) and adjust the AMPLIFIER tuning and LOADING until the best sine wave presentation appears. This will occur at about 250 ma. plate current. The author has kicked the 6146's up to 300 ma. by very heavy loading of the final but this is not recommended, especially when using an audio oscillator. The shorter duty cycle of the voice is much eaiser on the final than the steady tone.

Once you are familar with the operating conditions, operation is quite simple. When talking into the microphone watch the grid current meter. It may "twitch" a little, but never hit the modulation hard enough for it to read up-scale. Leaving the scope connected at all times is strongly recommended. Do not pay too much attention to the plate current meter, rather watch the scope trace. Any sign of flat topped waveforms is to be avoided. If the final is not loaded heavy enough, or if you draw grid current, modulation distortion will result.

Another word of caution. Instability cannot be tolerated. When the final is on, it is usually necessary to have the bottom cover on the chassis. The author had quite a battle with r-f in the hamshack, until a better ground system was installed. A sudden rise in grid or plate current when the DRIVER or AMPLIFIER knobs are adjusted indicates that something is "taking off". In some cases, it may be necessary to "swamp" the output coils in the adapter with a 10K resistor. In any event, do not put the DX-100 on the air until you sure the final is "tame" or pink tickets will be your reward!

By changing the function switch to position 4 or 5, manual control of AM or DSB is possible by using the PLATE switch on the front panel. Voice control on AM is available by switching the function switch to position 3.

Voice control by itself may be obtained by omitting V1, V2, S1, S2, T1 and the associated components. The only change in the installation instructions given earlier is to wire the connection to switch N to terminal 7 rather than terminal 9. It is not necessary to spread the contact on the KEY jack or to install the coaxial connectors.

Conclusion

The author feels that the DSB system should be considered a "stepping stone" to full single sideband operation. Once you get the feel of this type of operation you will undoubtedly want to add an audio phase shift system to get rid of the unwanted sideband. Sideband generators such as the Barker and Williamson 51SB may be easily connected to the DX-100 for single sideband operation. ■

Stolen, as usual, from

AUTOCALL

The bulletin of the
Washington, D. C. Mobile Radio Club

Last month's answers: #1. The batting order is: Green, Jones, Brown, White, Becker, Anderson, Black, Gray, and Smith. #2 Puzzler can be worked by checking with a math book. The formula for the intersection of two cylinders of the same size at right angles is 16 times the radius cubed divided by three. Or you can have at it with calculus, if you remember your calculus.

Now let's get you dithered up for this month. Puzzler #1 is a snap, just to get you thinking you are smart. It is a modulation transformer with two identical secondaries. Under given conditions the impedance of either secondary is 5000 ohms. What is the resultant impedance if: a) the secondaries are connected in parallel? b) In series?

Puzzler #2. Bill, John, Henry and Joe have to catch the 6 o'clock train.

1) Bill's watch is ten minutes fast but he thinks it is five minutes slow.
2) John's watch is ten minutes slow but he thinks it is ten minutes fast.
3) Joe's watch is five minutes slow but he thinks it is ten minutes fast.
4) Henry's watch is five minutes fast but he thinks it is ten minutes slow.

Each arrives to catch the train according to his belief of time. Who loses?

Puzzler #3. From W3VDL: A ham spends $75.20 in buying two types of tubes. Type A costs $3.70 each and type B costs $2.30 each. How many of each did he buy? (A solution is possible; the answer does not have to be found by trial and error.)

We'll try to remember to put some of the answers in next month so you won't chew your finger nails down.

OHIO

Saturday, April 6, at the Dayton Biltmore Hotel Dayton—the Dayton Amateur Radio Association will sponsor its annual Hamvention. This get together is one of the most widely attended, largest and finest held anywhere. The day long program will again feature outstanding speakers on all phases of Ham Radio. Several excellent forums will be held throughout the day for DX'ers, novices, V.H.F., etc. Bring the XYL's as a fine program has been prepared for them. Many fine prizes will be given during the day. As in the past the Grand Banquet will terminate the affair. Plan now to be one of the more than 2000 which attend annually. Tickets are $5.50 in advance, including the Grand Banquet, up to and including April 3rd—after this date $6.00. Reservations, more information, and an attractive brochure may be obtained from D.A.R.A., P.O. Box 426, Dayton, Ohio.

NOVICE

The Novice column is a monthly feature existing to supply information for those just beginning Amateur Radio as a hobby. Your comments and questions are solicited and should be sent direct to Mr. Stoner including a stamped, self addressed return envelope or post-card.

Donald L. Stoner, W6TNS
P. O. Box 137
Ontario, California

To think that I was complaining that I had received no mail last month! It looks as if I will be needing a new and larger post office box, if the volume increases. Each time I go in to collect my mail, I catch the employees throwing sidelong glances that are anything but smiles. I was very surprised to find that most Novices include a post card or stamps for the reply. As a matter of fact, the letters from the Novices contain a greater percentage of return postage, than do the letters from readers of the surplus column. I do not know what this proves, but I do appreciate it when you include return postage.

I am happy to report that I have finished building my *Heath DX-20* and the results have been overwhelming. It was four evenings of spare time in the construction stage and although I rushed the job somewhat, it worked the first time around. This probably can be attributed to a well written construction manual, rather than my kit constructing prowess.

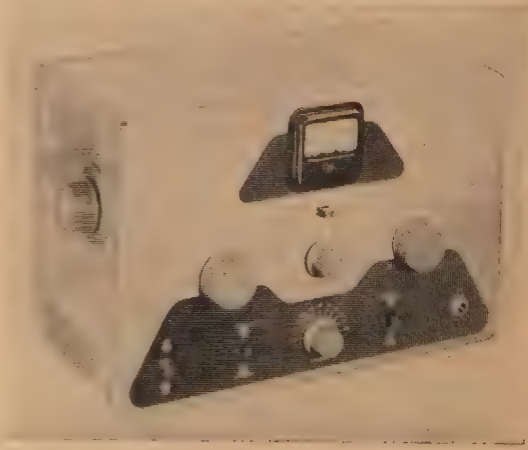
The following evening, the DX-20 was checked out for proper operation on all bands, 80 through 10 meters. The power output, with 50 watts input, was found to be 33 watts on all bands except 10 meters, where it dropped to 31 watts. The keying was clean and no chirps or clicks were reported by any of the stations that I contacted. War surplus crystals were used on all bands, and some of the rocks were quite "sluggish" in other circuits.

You might be interested in an experiment that I tried with the DX-20. The rig was connected to a dummy load and the final adjusted for a full "Novice kilowatt" (75 watts). The DX-20 ran for 15 minutes in this overload condition and at the end of this time, no failure had occurred, and I checked the power output again. This time it checked 28 watts output (after re-adjusting for 50 watts input) showing that the output tube had been damaged only slightly. I do not recommend that you try this on your DX-20 for it does strain the power transformer, in addition to "flattening" the 6DQ6 final amplifier. It appears that at the normal 50 watts input, the DX-20 will chug along for quite some time without giving trouble.

I do have one criticism of the DX-20, however. With a 3700 kc "rock" in the crystal holder and the oscillator tuned to 80 meters, it was possible to tune the final amplifier to the second harmonic (7400 kc) which is outside of the 40 meter amateur band. Many other Novice transmitters contain this "fault" and I am not sure what can be done about it, in the design, without introducing other complicatons. In any event, when you tune the final to resonance, in *any* transmitter and find that you have two "dips," tune the final capacitor to the position that contains the greatest capacity (plates meshed). In the case of the DX-20, this corresponds to the lowest numbers on the dial. *Better yet,* to be absolutely certain, check the transmitter output with an *absorption wavemeter* to make sure you are on the right frequency.

DX-20 Circuit Description

Let's take a closer look at the DX-20 from a technical standpoint. Since this is more or less a standard, time proven circuit, it could be a description of almost any of the other Novice transmitters such as the Adventurer, Globe Chief, etc.). A quartz crystal is used to determine the carrier frequency and it is made to oscillate in a Colpitts circuit, using a 6CL6 tube (similar to the octal 6AG7). To provide a clearer understanding of



how this occurs, let me quote from the Heath DX-20 manual. "There are a number of natural crystaline substances which have the ability to transform a mechanical strain into an electrical charge. Likewise, they are also able to change an electrical charge into a mechanical strain. This property or reaction is called piezoelectricity. For example, if we were to cut a small plate or bar of this crystal substance and place it between two conducting electrodes and then connect these electrodes to a source of voltage, the crystal would become mechanically strained. Conversely, if you were to squeeze the crystal between the two electrodes, a voltage would develop between the electrodes."

"One may visualize what does happen in a conventional oscillator circuit where our crystal holders exert pressure and a voltage is caused to exist across the electrodes on each side of the quartz wafer. It may be said that the crystal, when placed in the grid circuit of an oscillator and upon appication of power to the circuit, is shocked into oscillation and vibrates at the frequency for which it is ground." As an example, you can imagine the crystal as a steel rule that you allow to stick over the end of a table. When you pull down and release the rule, it continues to vibrate, or *oscillate* for some time. However, you will note that as time passes, the speed of the oscillation will *not* change, only the limits to which the rule travels will decrease. Now, if you slide more of the rule past the end of the table, and "twang" it again, the speed of the oscillation will decrease. Conversely, if you reduce the amount of the steel rule past the edge of the table, the frequency will increase. Not only can you prove this with your eye, but if you listen carefully, you can hear the frequency change.

How does all this affect the DX-20, you ask. Well the same thing applies to our oscillator circuit. The rule corresponds to the crystal. The greater the mass of the crystal (or rule), the lower the frequency of oscillation. When one grinds or etches a crystal, the mass is reduced and the frequency of oscillation increases. Obviously, if you only "twang" the rule once, it soon stops oscillating. Same deal with the crystal. Therefore, the oscillator tube simply supplies a "twanging" voltage to the crystal. Each time the crystal oscillates, it "twangs" itself into oscillating again and the process continues until you release the key, or turn the power off. In addition to its job of sustaining oscillation, the 6CL6 also amplifies this oscillation and it appears across a tuned plate coil and capacitor combination in the plate circuit. This tuned circuit may be resonated either to the *fundamental* frequency of the crystal or to one of its multiples or *harmonics*. It is this radio frequency energy that is coupled to the grid circuit of the final stage (the *power amplifier*), where it is greatly amplified. A *pi network* which tunes 80 through 10 meters matches the plate of the final amplifier to the antenna. The transmitter is keyed by breaking the cathode circuit to both the 6CL6 and the 6DQ6 tubes. A meter switch is provided so that you can check the plate and grid current of the power amplifier.

The power supply is novel and warrants comment. A 5U4GB is used as a full wave rectifier. Although a 5Y3 could have been used (at a lower cost), the 5U4GB provides an extra measure of protection against tube failure. The standby-transmit switch is located in the center lead of the high voltage winding. This switch is shunted by a resistor capacitor combination that prevents arcing of the contacts. To avoid breakdown of the electrolytic capacitors, two 450 volt units are used in series. The parallel connected 15K resistors serve several purposes. They equalize the voltage across the capacitors, discharge the capacitors when the power suppy is turned off and last but not least, they act as dropping resistors for the 6CL6 screen voltage. To further improve the keying characteristics, the filter choke is tuned by means of a .1 mfd 1200 volt capacitor. This capacitor limits the surge voltage under key-up conditions.

That is about the story of the Heath DX-20. I might add that I was quite pleased with the

(Continued on page 96)

DX-20, cover removed

RTTY

Byron H. Kretzman, W2JTP
Lo Ridge Drive, High Hills
Huntington Station, N. Y.

Tone standards for RTTY have been described before in *CQ*, but here is one that is a little easier to build (RTTYers *build*) and considerably easier to use. Don't let the transistors and etched wiring board scare you. In fact, it was those W4UHN articles in *CQ* (Feb., Mar., Apr., Sept., Nov. '56) on printed circuits and etched wiring that started the whole business.

The first time I lined up an RTTY converter I borrowed a 425-cycle fork oscillator and made the usual lash-up to obtain Lissajous figures on the 'scope. Counting loops to find the 5-to-1 ratio was bad enough, but finding the 7-to-1 ratio was rough. A drifting audio oscillator didn't help, either. "There *must* be an easier way to do this," said I to myself. Two years and a couple of pair of glasses later I found it.

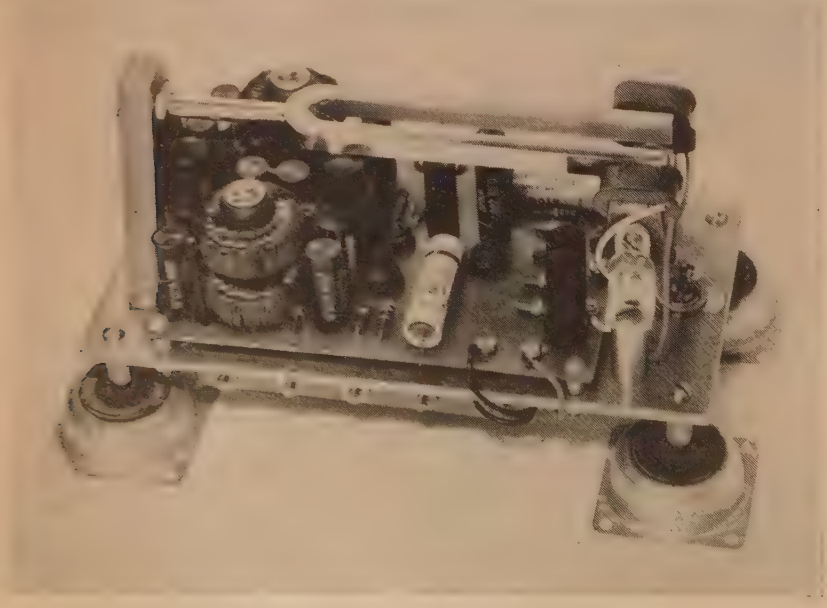
Without a big chassis full of vacuum tubes, without a heavy a-c power supply, here is a completely self-contained standard that puts out 2125 cycles and 2975 cycles *directly*. You don't even need a 'scope to use it—a VTVM is sufficient. And it is not expensive to build. A $1 tuning fork controls a transistor oscillator on 425 cycles. Transistor multiplier/amplifiers tuned to the fifth and seventh harmonics then provide the 2125 and 2975 cycles desired. Simple, heh?

Construction

A 3½" by 7" aluminum plate, ⅛" thick, is the "chassis" for this tone standard. Steel was avoided for magnetic reasons. Four surplus "shock" mounts isolate the fork vibrations from the work bench. The power supply is a 7½-volt "C" battery clamped underneath the aluminum plate. The toggle switch on the end turns the standard on and off.

Following the directions in *CQ*, an etched wiring board 3¾" by 5" was laid out. As you will notice, by looking at the photograph of the underside of the wiring board, this took a little thought to avoid cross-overs. Screw terminals for the external connections were made by simply tapping with a 4-40 tap, hollow rivets—after soldering in place. Don't forget to leave as much copper as possible around these terminals to take up the heat when you solder them in place. If you don't, the copper foil will lift from the board. Holes for the transistor leads were drilled in an open space. The leads were left full length, pushed through the holes, and then small-diameter insulated tubing was slipped over them to prevent possible shorts.

The paper capacitors are of the molded tubular type with both leads coming out the same end. These are made by *Sprague* especially for printed circuit use. *Mallory* makes similar single-ended capacitors. Use of this type of capacitor saves considerable space on the board. The electrolytics are ordinary pig-tail capacitors.



W2JTP Fork-driven Tone Standard

Mounting toroids is always a problem. Brass studs, 1½" long and ¼" in diameter were insulated by a piece of tight-fitting vinyl tubing. The first toroid was then slipped over the stud, followed by a rubber grommet used as a spacer to the next toroid. Another grommet was then slipped on top followed by a flat washer, lock washer, and nut.

Tuning Fork

The "bargain" tuning fork was originally a 435-cycle fork, catalog #TM4796, purchased from *Herbach & Rademan*, 1204 Arch St., Philadelphia, Pa. A good round file was used to notch the softer crotch to move the resonant frequency 10 *cycles* lower. Take it easy—not much filing is necessary. A 425 cycle fork was borrowed to compare it with frequently while filing.

A high impedance headset was cannibalized to obtain the exciting coils. Each coil measured 1000 ohms, d.c. Magnetic bias for the fork is supplied by a ¾" round by ½" long Alnico magnet robbed from a small a-c/d-c b-c set speaker. Hex-head ¼-20 *steel* bolts were soldered to each end of the magnet to extend the magnetic circuit to the coil pieces. Approximately 1/64" air gap is between each of the pole pieces and the tines of the fork. The handle of the fork was threaded with a ¼-28 die and bolted to the solid steel triangular mounting block. A *very* solid mounting like this is essential.

Circuit

The transistors used are the inexpensive 2N107's. The fork-controlled oscillator is resistance-capacity coupled to the harmonic amplifiers. The toroids are the "88-mhy" coils removed from surplus C-114A telephone loading coils. (Jan. '56 *CQ*, p. 51) Admittedly, mica-dielectric capacitors would have been better for the tuned circuits, but considering the large values of capacity necessary and the relatively high cost of micas, it was decided to use paper capacitors. Approximately .053 ufd was required for resonance at 2125 cycles, and approximately .028 ufd was required for 2975 cycles.

High impedance output is provided, so coupling to a grid through a blocking capacitor is desirable. If coupling to a 500/600 ohm input is necessary, a series isolating resistor of 100k ohms or more is required as loading increases distortion. Of course output will be reduced.

Output is about 2 to 3 volts, r.m.s. Distortion, measured at 2125 and 2975 cycles, is less than 3%, which is a quite usable value. Distortion can be reduced to less than 1%, however, by careful selection of the capacitors resonating the toroids, or by removing turns from the coils themselves. This didn't seem worth the trouble, though.

With the 7½-volt battery supply, the total current drain is only about 4 ma. The battery will last a long, long, time.

A description of this dual tone standard appeared on page 196 of the February issue of *Electronics*.

AMATEUR RADIOTELETYPE CHANNELS

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.

National, AFSK 27.2, 147.96, 144.138 mc.

Area Nets:

California	147.85 mc AFSK on AM
Chicago	147.70 mc AFSK on FM
Detroit	147.30 mc AFSK on FM
Washington, D.C.	147.96 mc AFSK on AM
	147.495 mc AFSK on AM
New York City	147.96 mc AFSK on AM
Buffalo/Niagara	147.50 mc AFSK on AM
Boston	147.96 mc AFSK on AM
Seattle	147.00 mc AFSK on AM
Spokane	147.15 mc AFSK on AM

Mail

The past few months has brought a noticeable increase in mail to your RTTY Editor. (Tnx, vy much) Generally speaking, most letters ask one or two questions: Number 1 is, "Where can I get a *Teletype* machine?" Number 2 is, "Who near me is active on RTTY?"

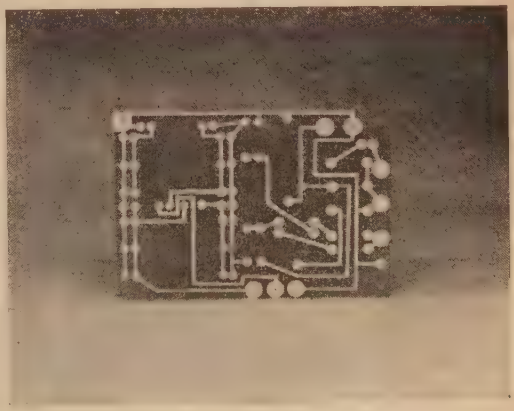
To answer the easiest question (#2) first, the best way to find out those RTTYers near you is to get a copy of the "RTTY Call Book." This most handy book is available from *RTTY, Inc.*, 372 West Warren Way, Arcadia, California for $1.

Answering the first question is a bit more difficult. While machines and sources of machines are more plentiful than they were a decade ago when RTTY began, the increasing interest still has the demand exceeding the supply. As Wayne, W2NSD, has indicated editorially (*CQ* Dec. '56, p. 112), caution here is advised. The best thing to do is to contact the nearest *active* RTTYer. He will know the current and local availability of machines. Perhaps one may be up for resale right near you.

Tape for Traffic

Remember, back in the August 1956 issue of *CQ*, on page 72, your RTTY column beat the drums

Etched Wiring Board, Underside



for RTTY and tape gear for traffic handling. Well, we would like to mention again that W1BDI, WØBP, and K6GZ have a transcontinental RTTY net in operation, which to quote BeeP, ". . . gets message traffic thru and answers back in a matter of minutes on *regular* schedule." Just to prove it, BeeP sent me a copy of a run of seven messages handled by tape, all perfect copy. For the benefit of those unsuspecting traffic handlers with glass arms and gravel voices who might have glanced at this page, this traffic is being handled at 60 words-per-minute, automatically, with perforated TTY tape.

Across the Nation

K4HRD in Roanoke, Virginia, reports efforts towards a Virginia RTTY net with W4AYC, K4BJP, W4CKW, K4HST, and K4HZW. Other newcomers to this most fascinating branch of amateur radio (plug) are: W4PTW in Miami, Florida; W3NQA in Warren, Pa.; K2OAR in Montour Falls, N. Y.; W8ORD in St. Albans, West Virginia; K2IAX in East Aurora, N. Y. (sounds like a good 2-meter QTH); K4UZI in Coral Gables, Florida; and W5UBP in Alamogordo, New Mexico.

Bill Seibenmorgan, W9IHO of Terre Haute, Indiana writes, "I would like especially to see some complete dope on terminal units, not just a diagram, but what to expect, voltages, how they went about tuning their toroids, etc. I would also like to read some dope on how various fellows go about setting and determining the amount of shift on their VFO's." Wonder if you read that fine article on a 'scope tuning unit by WØHZR in the May 1956 issue, Bill? There is a gadget that can inspect not only your own signal but the other fellow's as well. Incidentally, the fork-driven standard described at the beginning of this column is an excellent source of calibration for Bruce's 'scope.

Tom Mead, KN9EUD, of Lake Forest, Illinois, is on 80-meters, sending space, but hasn't had a QSO yet. He operates on 3745 and 3704 kc with 65 watts to an end-fed Zepp. Can somebody help Tom out with an RTTY QSO?

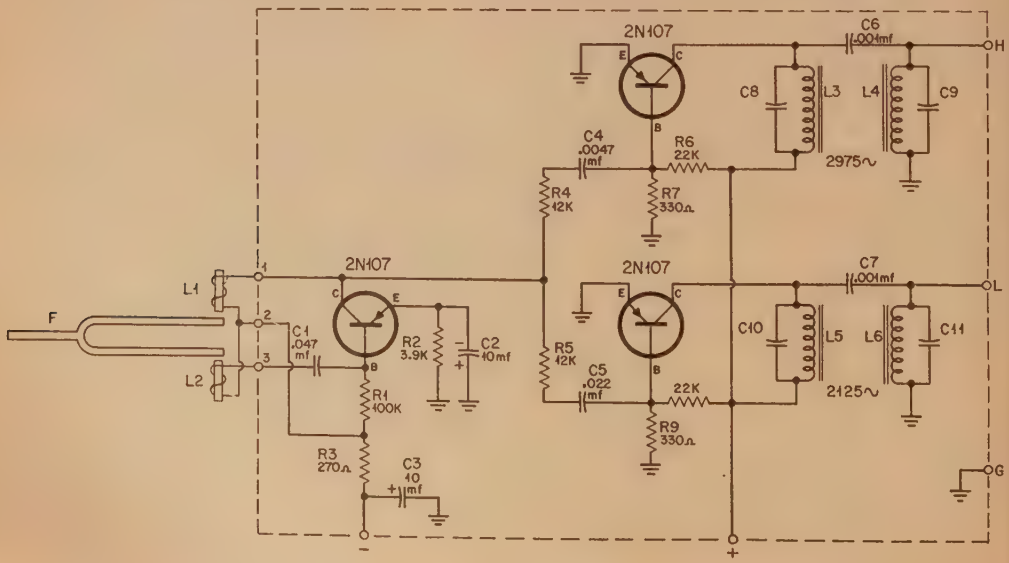
George Schee, W7ULL, reports on activity in the Spokane, Washington area: "There have been

(Continued on page 114)

Parts List

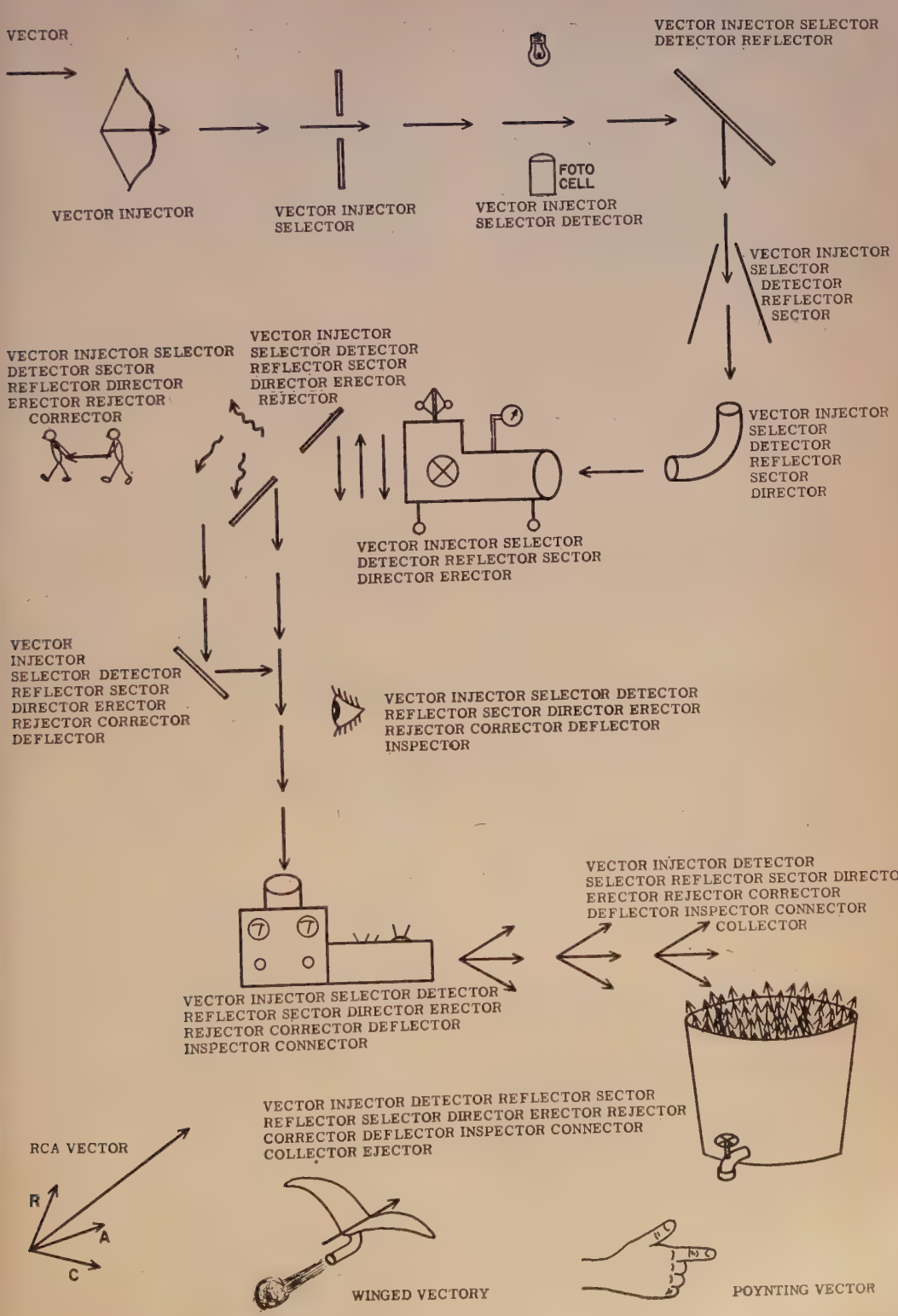
C1—.047 μfd, 200-volt paper, Sprague 2SE-S47.
C2—10 μfd, 50-volt electrolytic, Sprague TVA-1304.
C3—10 μfd, 50-volt electrolytic, Sprague TVA-1304.
C4—.0047 μfd, 200-volt paper, Sprague 2SE-D47.
C5—.022 μfd, 200-volt paper, Sprague 2SE-S22.
C6—.001 μfd, 200-volt paper, Sprague 2SE-D10.
C7—.001 μfd, 200-volt paper, Sprague 2SE-D10.
C8—Approx. .028 μfd total, 200-volt, 3 Sprague 2SE-????.
C9—Approx. .028 μfd total, 200-volt, 3 Sprague 2SE-????.
C10—Approx. .053 μfd total, 200-volt, 3 Sprague 2SE-????.
C11—Approx. .053 μfd total, 200-volt, 3 Sprague 2SE-????.
F—Tuning Fork, modified 435-cycle, Herbach & Rademan TM4796.
L1—Headphone coil, 1000-ohms, d-c.
L2—Headphone coil, 1000-ohms, d-c.
L3—Toroid, series coils, 88-mh, Graybar 717S19 or 713S21.
L4—Toroid, series coils, 88-mh, Graybar 717S19 or 713S21.
L5—Toroid, series coils, 88-mh, Graybar 717S19 or 713S21.
L-6—Toroid, series coils, 88-mh, Graybar 717S19 or 713S21.
R1—100k ohm, ½-watt, Allen Bradley EB.5.
R2—3.9k ohm, ½-watt, Allen Bradley EB.5.
R3—270 ohm, ½-watt, Allen Bradley EB.5.
R4—12k ohm, ½-watt, Allen Bradley EB.5.
R5—12k ohm, ½-watt, Allen Bradley EB.5.
R6—22k ohm, ½-watt, Allen Bradley EB.5.
R7—330 ohm, ½-watt, Allen Bradley EB.5.
R8—22k ohm, ½-watt, Allen Bradley EB.5.
R9—330 ohm, ½-watt, Allen Bradley EB.5.
Transistors, General Electric 2N107.
Battery, 7½-volt "C," RCA VS 029.

Fig 1—Fork-driven Tone Standard



Vector Conjecture

Robert Katzine, K2UFS
Box 366, U. of Penn. Dorm.
Phila, Penn.



Bob Adams, K2DW
245 Revere Road,
Roslyn Heights, N. Y.

This month we have a new leader in the DX race, none other than Mort, W2KR. Winner of this month's QSL contest, his old rig is shown. (look on contents page for page number). His antenna is a W3DZZ tri-bander. W2KR has worked the following on two-way SSB: AP2BP, BV1US, KC4USN, CO5LF, KT1DD, CN8GD, CP5EK, CX5AF, DL4RM, EA5DT, EA9AR, EAØAC, ELØA, F8RQ, FS7RT, G6LX, GI3CWY, GM8MM, GW3EHN, HB9FU, HH2JT, HP1EH, HR2WC, HZ1AB, I1BAO, KA2YA, KB6BA, KG4AM, KG6AA, KH6CT, KL7BPW, KM6AX, KP4AAO, KR6OJ, KV4BB, KX6AF, KZ5WZ, LA8WE, OA4BK, OD5BZ, OE6OJ, ON4CC, W4DGW/OQ5, KG1FR, OZ3EA, PAØEU, PJ2MC, PY2JU, SM6SA, SVØWA, TA2EFA, TF3CJ, TG9AD, TI2RC, VE4NI, VK4AB, VP7NQ, VP9HH, VQ4EO, VR2CG, VS6BE, K2DW, XE1A, YN1WC, YU1AD, YV5FL, ZD4BF, ZE2KR, ZL3PJ, ZS1RV, ZS3BC, ZK1BL, 4X4FB, 5A2TZ, YS3PL. How many of these stations have you worked? There are now eighty-seven countries with SB activity.

Arthur Godfrey's base station is now set up in the bush, and is operating on 10, 20 and 15 with the call FQ8LIB. Ozzie, W2HC is the op. Godfrey's DC-3 plane equipped with SSB was to have been used in Africa but due to bad weather over the North Atlantic it was left behind. Arthur K4LIB and Curt LeMay, KØGRL will hunt game for three weeks, and will also work the SB gang from the base station.

As reported in last month's issue, our SSB DX Contest was a big success. Logs from 386 participants have been received to date and more are pouring in daily. According to present records there were fifty-three countries represented during the Contest, and over one thousand stations exchanged Contest numbers. Nearly every one attached a note with their log expressing the wish that we hold another contest soon. Everyone seems to have enjoyed themselves.

Unofficially as of this moment the world winner appears to be CN8MM with EVA doing most of the operating. In the two day period CN8MM made 489 contacts in thirty-four countries on ten, fifteen and twenty meters. The total point count was 1456 using the designated system of three points for contacts between stations on different continents, two points for contacts between stations in different countries on the same continent, and one point for stations in the same country. No multipliers were allowed.

The second highest scorer seems to be CN8JD who made 475 contacts, with 1416 points.

HR2WC made the most contacts reported so far with 535 stations worked. Wayne's point totals are 1118, to cop fourth place.

SVØWA, Bill Slater, sent in a fat log showing 437 contacts and 1247 points.

The gang at "Honey-bucket Hollow", KA2YA placed fifth with 299 contacts and 892 points.

Following the five leaders are the following in the order of their scoring which is still unofficial: DL4CX, TG9AD, F8RQ, F7AF, VE7EL, W2ONV, DL1UX, W6ONP, LA8WE, W3ZP, GM3CIX, VQ4EO, VQ4EU, G3AAO, GW2DUR KZ5WZ and ON4CC. We will have the official report in the next issue with all the highlights. My sincere thanks to all of you for making our first SSB contest such a wonderful success.

We are now receiving many registered packages containing QSL card verifications for two-way SSB contacts with fifty or more countries. This CQ award was announced several months ago and is the "Worked Fifty Countries Two-Way SSB" certificate. The first three to qualify with QSLs submitted were K2DW, OH2OJ and W8QNF. These certificates are numbered in order of award so hurry up with your vertifications.

During a nice rag-chew with UB5KAB, the operator Leo said that there is tremendous interest in the Soviet in SB and that many exciters are being built. There are now five active stations on SSB in Russia.

Bud, W8JXM brought his worked list to 56 with VS6BE, OD5BZ, ZD4BF, EA9AR and HZ1AB. Jerry, W6JJU sent in his list of fifty countries worked as did K2AAA. Herb, WØQZW is now up to 44 in St. Louis.

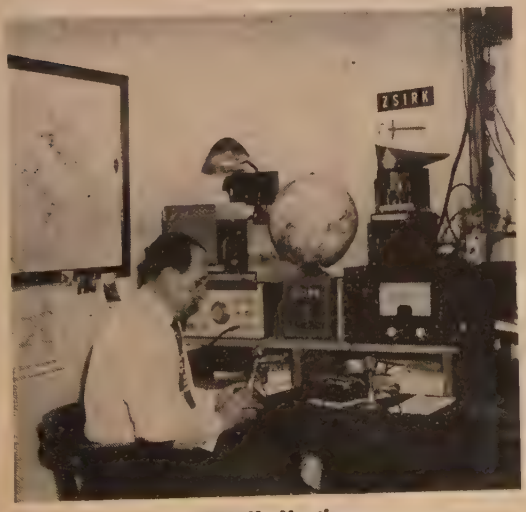
W9KOY, Net Manager of the Inter-State Sideband Net reported the following traffic handled

COUNTRIES WORKED
(Two-Way SSB)

W2KR	75	ZL3PJ	66
K2DW	74	W2JXH	65
G6LX	71	HR2WC	64
W3ZP	71	G3MY	64
ZS6KD	71	W6IAL	61
W4INL	68	OH2OJ	61
VE4NI	68	PAØIF	60
VE2GQ	67	W5HHT	60
K2AAA	67	DL4SV	60
VK3AEE	66	W2CFT	60
ZL3IA	66	CN8MM	60
W2EWL	66		

YV5FL, Corny

ZS6WG, Heinz



ZS1RK, Montie

last month: 690 formals, 96 informals, an average time of one and a half hours for 42 stations

(Continued on page 115)

ZS6ACH, Dave ⮝ ⮟ ZS6NZ, Len

ZS6AIY, Len ⮝ ⮟ ZS6KD

CQ Worldwide VHF Contest

Sam Harris, W1FZJ
P. O. Box 2502, Medfield, Mass.

Instructions

What: A VHF Contest primarily designed to give the VHF operators a chance to compete on an even basis, and have fun doing it.

When: 8:00 P.M. Local Standard Time April 27, 1957 to 8:00 P.M. Local Standard Time April 28, 1957.

Who: All amateurs throughout the world.

Winners certificates will be awarded to the top scorers on *each* VHF band for each state or province in the United States and Canada and for each country.

Separate certificates for the top scoring Novice in each state or province and for top scoring equivalents in other countries will also be awarded.

How: Just fire up on your favorite VHF band

90 feet of home made tower. Gordon Conley (W8AIN) cut it, drilled it, bolted it together and put it up. (Like to try it? Ask Gordon. He'll tell you how.)

and exchange contest information with as many stations in as many different (a) Counties in the U. S. and Canada (b) Provinces, states or other similar political subdivisions in countries other than the U.S. and Canada. Contacts must be made on the band for which the log is submitted.

Separate entries may be made for more than one band, but the score for each band must consist of contacts made on that band only.

Crossband contacts are permissible for extra contact points but sections must be worked on the band the transmitter is on and for which the log is submitted.

Only one contact per station is allowed, whether it be crossband or direct.

Scoring: For each complete exchange of information consisting of message number, county (or political subdivision) and state (or country), and handle, two points are accrued.

The total number of contact points is then multiplied by the total number of different counties (or political subdivisions in foreign countries).

For instance: Total number of contacts 100 x 2 = 200 Total number of counties 50. Contest score 50 x 200 = 10,000.

Counties or other political subdivisions in different states, provinces, or countries having the same name are obviously separate counties and count as such in the totalling of the multiplier.

The exchange of reports, while not required by the contest rules, is suggested as good operating procedure.

Contest Reporting: Contest reports should be turned in on the CQ log forms as described in the March CQ. In case the forms haven't reached you yet, a facsimile form can be used provided the form and size are followed closely. To salve the injured screams which are now issuing forth from the world over, I extend a standing invitation to anyone to come help tally the logs turned in in the past on old mud guards (written in red mud), clay tablets (cuneiform of course), sheets of paper two inches wide and thirty feet long (typed like a poem by these people who must be artistic), and other positively impossible combinations, including the obvious perforated ones.

Time: As mentioned in previous contest issues, it is desirable to end the contest with a round table discussion and exchange of scores. In this manner preliminary contest reports can be gathered and published in an earlier issue.

Contest logs must be post marked by the 15th of May in order to be eligible for certificate.

Address contest logs to: Log Department, Microwave Associates, Burlington, Massachusetts, U. S. A.

Good luck and have fun. Be sure and get your logs mailed in time.

2 Meters

The two meter band has been carrying on in it's usual late winter manner. Several good auroral openings have been observed. Most of the openings thus far have shown a tendency to provide paths which are extending farther to the south. In truth it is hard to tell if the aurora is getting farther south or if the stations located there are becoming more adept at working it.

Several tips for the benefit of those who have just started aurora work might be in order. Most important item to remember is to peak up your beam direction. Aurora signals seldom come from due north. In fact they are liable to come from any direction from due north to 90° away (toward the station in question) from north. Furthermore if you live in Virginia and find signals from northern Ohio coming in at 45 degrees west of north it doesn't mean that signals from Illinois will be in that direction also. As a matter of fact they will probably peak up five or ten degrees more to the west. The important thing to remember is that they seldom come from the same direction and even during a five minute period they may shift enough to hop out of your beamwidth.

Second item to watch is your receiver bandwidth. Some weak auroral signals can be best copied with the receiver selectivity in the broad position. Others read best with maximum selectivity. There is no rule of thumb. You just have to try.

It is worth while remembering that openings which fade out in mid evening quite often come back stronger shortly after midnight.

Many methods of detecting the start of an aurora opening have been outlined previously. The most reliable one is to get on the air and get active. And *Remember:* This *is* the aurora season. Don't miss it.

Quantum Mechanical Amplifiers, Masers and RG's

In my 25 years of ham radio there have been a large number of improvements made in receiving and transmitting equipment. Unfortunately, in most cases, the improvements consisted of refinements of existing techniques. Better tubes. Improved components. Trickier circuits etc. Above 400 megacycles the development of the magnetron was a tremendous advance. (Unfortunately not for hams.) The transistor looks like it might be a step forward in many applications but does not, in its present form, appear to offer any significant improvement in our communication field. (It may, in some cases, do the job more efficiently but it does not come up with improvement in S/N.) Scatter techniques, aurora, moonbounce etc. are natural extensions of routine radio communications.

So the complacent V.H.F.er sits back and contemplates his cascade 416B's. His KW final and 64 element beam and expounds to all and sundry about how his set up is as close to the theoretical optimum as present day techniques and F.C.C. regulations will allow. Quantum Mechanics are found in A.S.F. and a Maser is the guy who rubs you down after a steam bath. And then the roof falls in because this isn't science fiction.

This is fact. Somebody has made a significant improvement in the communication field. In particular in the V.H.F. and up field.

It's hard to believe but somewhere, just out of our grasp, there is an amplifier that makes our 416B's look like 201A's. Not only that. They don't look like tubes and in fact they aren't. I don't pretend to know how they work. I do know a few scant items which I will pass on to you herewith.

A quantum mechanical amplifier is about the most useless device ever devised by man. In addition to weighing a ton, needing the assistance of a vacuum pump or two and having to be supplied with liquid air, ammonia and a 40 kv supply it accomplishes an output of 7×10^{-3} micro watts on the unheard of frequency of 23870 mc. Of course in it's defense it can be pointed out that the frequency is in fact 23,870.127 $\pm$ .002 mc. And, if your ambition in life is to be able to tell what time it is, such a device is to be greatly admired. Speaking strictly as amateurs and VHF men, however, it is obvious that this device is not for us and articles on same can be passed over lightly and nothing will be missed. Except for one thing. See these little fellows slaving away in all these big laboratories spread out all over the country are not satisfied with a mere discovery. They have to explore. They have an insatiable thirst for more and more explanations of observed phenomena. "If *this* stuff acts like this when I do that, what do you predict (or guess) will happen if I take *this* out of the experiment and substitute a passel of *that?*" And so the Maser was born.

Maser. Born out of quantum mechanics. Spawned in the far flung laboratories of the world. Fathered by those same little fellows who now are giants because this something we can use. This can be practical. This is MASER.

Microwave amplification by stimulated emission of radiation. What does it means to us? The first thing that strikes the eye as being practical is amplification. That we can use. The frequency that it will work on is still limited. The search for suitable materials is still on. Amplifiers have been made as low as 150 mc and as high as 23,000 mc or so. Noise figures need a new term of reference to measure the maser. Suffice it to say that improvements of twenty db or more can be expected. Is it practical? No. Not yet. Will it ever be? If it isn't there ain't a cow in Texas.

Your duty is clear. You, the testing ground for all these crackpot ideas that come from all these little fellows in all these big laboratories etc., have to shift your thinking into high gear. Clear the decks for something new. Get busy and read up on this stuff. Start conniving. Who do you know that can get you in on this thing? Write your congressman. Telegraph the president. Join the Navy. Get a job in one of those big laboratories. Get on the ball, let's GO.

Africa Not all the dx is being worked on the low frequencies. W8LPD in Cincinnati, Ohio just turned in a couple of contacts with VQ2PL and ZE2JE. This momentous occasion occurred on the 18th of February 1957. (I don't like to say "I told you so", but I did, didn't I?)

John certainly deserves recognition for making the first six meter contact with the continent of Africa. Cheers also to VQ2PL and ZE2JE who for some time now have been holding daily skeds with ZS9G.

Alaska Meanwhile W9JCI and KL7VT (Summit, Alaska) had the first go at a W/KL7 contact. Earl (KL7VT) has been trying for some time and it finally paid off with contacts almost everywhere except (Sob!) W1 land.

South America *Al* (LU7PB) supplied the majority of "W land" with Argentina contacts in the last month. As usual contacts ranged from VE1 land to XE land.

Rene (PZ1AE) gave Surinam representation with the same general coverage type of contacts. Rene has worked twenty-four states now.

The general trend on six meters is to more and more DX working and considerable lessening of the local and ground wave type of contacts. Letters and phone calls from various parts of the country all have the same theme. "What happened to activity on six"? If one listens to six during a band opening it is obvious that nothing has happened. In fact if anything the trend is toward more activity. However when the band is not open it certainly does drop dead. In the heavily populated (Six Meter-wise) areas this is no cause for alarm. It is obvious that out of the 600 some odd W1's which are in the reliable working range of most anyone in New England, some of them are going to be on the air looking for contacts. However if you live in Alabama, or Mississippi or Michigan or any of a hundred other locations you are apt to find yourself tuning a dead band. The thrill of maintaining a schedule over a rough path with signals down to the CW level is pretty well hidden after a day of working S9 plus signals from most anywhere in the world. Particularly if the guy you have been scheduling has been coming in half the day with a good readable phone signal on back scatter. It is however, the fringe benefits from these schedules which make Six Meters a "liveable" band in many areas. A consistantly maintained schedule between any two points is the starting point of activity for anyone within range of the two stations. This means that if you want activity you just have to get active. Make some schedules. Keep them religiously. Tell everyone you can all about them. If you feel that there is nobody within your reliable working range you had better take a look at what W4HKK has done with his low power. Go ye and do likewise.

Flushing, New York A contributor, Al, (K2DDK) sez:

"After having worked eleven states with a Gonset, I horse-traded it away and got myself set up for some

serious VHF operation. During the January VHF SS, I worked my lungs to death with the Gonset and managed only 1652 points. This is not the way to win a contest; the answer lies in the use of cw for those extra sections. I've always said that, but never (til now) practiced what I preached!

The rig now is a Millen 90810, with an 829B final running cool at 120 watts input, strictly cw. I have plans for a PM modulator before the next contest: but am having so much fun on cw I may forget about 'phone altogether. Right now I have only the 2 Mtr coils for that rig, but will order the 6 Mtr coils for it as soon as I can (that ought to make Helen happy) because I need the use of 6 Mtrs to complete my Worked All States (have but 4 to go).

Under construction is a converter for 220 Mc and I have plans for a low noise job for 6 Mtrs; that is my next project."

"Real reason for writing you is to let the gang know I am looking for new states; I need Maine and everything beyond Virginia on 2 Mtrs. Converter is Tecraft ahead of either of my two Super Pros and the beam is a 6 element Telrex, 50 feet high. Also would like skeds with the gang in WNY section (there are 2 Mtr men up there?). I tune from 144.000 to 144.120 Mc for cw signals."

"Count me in on the first 100 kc being strictly for cw; wonderful idea, I only wish it had some teeth in it to stop the 'phone signals from messing up the Aurora sessions. The 100 kc subband for cw does not seem to mean much around here, but I'll keep on fighting for it just the same."

Glad to hear from you Al. Don't worry about activity up here. There's plenty.

Montgomery, Alabama Jim (K4GDM) has the following remarks to pass along:

"Well a promise is a promise so here goes about the 6 meter activity here in the heart of the deep south.

It seems the trend here is going more and more to the 50 mc band. About all one of the low frequency die-hard boys has to do to become converted is to visit one of the VHF shacks for one night. Our numbers are growing with more mobile rigs being heard around town. For the information of coming through town mobile, we monitor 50.1 mc every afternoon from the time my boys Butch K4HET and Ben, K4IVO get in from school till late movie time at night. Each weekday morning before worktime, and all day Fri., Sat., and Sun.

On Jan. 24, Bill, K2DPK/mobile got the surprise of his life when he put out a CQ as he came through town. Darn near all of us answered him at the same time. We were his first contacts since leaving New Jersey. I wonder how many contacts were missed because of fixed station not having squelch on their receivers. I accidently run on a very simple squelch circuit which most of us have added to our receivers here. It makes the difference between enjoying monitoring the frequency and being driven out of our minds with the noise or being driven out of the house by the XYL. When are the receiver manufacturers going to get hep and start putting squelch on the ham receivers??????" (*You tell 'em Jim*)

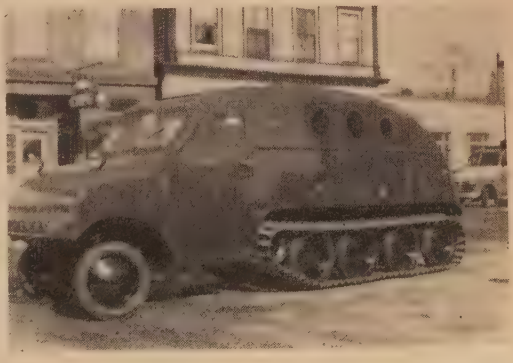
"Also had a pleasant personal visit from Lee, WØDO, who gave out with a CQ from a local motel cabin. Lee, whom we had worked on skip from Perry, Iowa, had brought along his Gonset Communicator on his way to Fla. Needless to say, it was only a few minutes after his CQ that he was in QSO with several fellows and out of that grew a VHF meeting at my house. A good time was had by all.

By the way, we are trying to have a meeting at least one night per week at someone's shack. This not only lets us see what is being done by the fellow VHF but allows us to thrash out any problems arising and just plain makes for good fellowship among the boys. (and Girls). Since beginning the weekly meetings, the interest has increased a thousand-fold. Might be the solution for many other towns who have had mild interest in VHF and just cannot seem to get off on the right foot somehow.

Lately we are hearing the statement "I haven't had

Here's Iowa on Two and Six. Claude (WØUSQ) says "Come and get it"

60 feet of Elprodco with 20 feet of mast extension. 8X8 Telerex on Two and 3 element Telerex on Six at WØUSQ



Anyone looking for Maine? This is where Russ (W1QCC) is hiding out, Pictou, Nova Scotia. Russ has his VE1 license and hopes to be on soon.

so much fun since I first started out in ham radio" coming from old timers like W4AUP who had one of the first ham stations in Ala. Seems a shame to hear a couple of locals running a hundred watts or more in a cross-town 75 mtr ragchew, QRMing the whole state, and being QRNed, when they could have a solid cross-town QSO on 6 meters with as little as 5 watts. Poor Misguided Ones.

The name of the local VHF bunch is "De Bums" pinned on us by W4ATF, who by the way, is the biggest bum of us all."

And just to prove your point Jim here's a letter from an enlightened misguided one.

Landenberg, Pa. Jim Collins (W3DBL)

"Two more fugitives from 80 meters are getting on the VHF bands via 6 meters. Before summer gets here we hope to be on 2 also. We are using a Johnson 6N2 which we put together, stealing the power and modulation from our Viking I. We modified the 160 meter—in or out—switch on the Viking to control the 6N2 right from the front panel. Relabeled the switch VHF instead of 160 and it works swell. At present, we are using a crystal converter ahead of our HQ129X but Flo came home from Wilmington the other day with the parts for a converter in the 1955 Handbook so I guess you know what Jim is working on now. The antenna is a 3 element Telrex 50 feet up but unfortunately there is a hill about 200 feet up directly in back of the house to the north. Anyone have any bright ideas about practical ways of combating that problem? We do own the land which is just field up to the hilltop but we aren't millionaires—meaning can't junk this house which is barely finished and build one on top of the hill. We started the house before we got into ham radio unfortunately.

We also would like to point out that Landenberg is about 15 miles NW of Wilmington, Del., and one of us is on most every evening. So swing your beams around this way, boys.

The band opening of February 3 was our first and when Nebraska came back to Flo's CQ she could barely reply! I also copped Missouri and Oklahoma.

Enjoy your column very much, Sam and hope we can work you and Helen on 6 sometime soon!"

I'm using 400 feet of feedline to my beam Jim. How far is your hilltop? Give us a call on the low end of 75 Meters and we can buck the Qrm while trying to figure out how to get you over the hill on six.

Davenport, Iowa Clark (WØUSQ) has been playing with his new "6N2".

The 6N2 is a dandy piece of gear, and it puts out a nice clean signal. It's only fault seems to be that it costs money!

Wish the gang would get interested in 2 again. It gets real lonesome here in Davenport with no activity. W9AAG at Woodhull, Illinois, is the only reliable station on 2 around here. We can work Chicago any night, but the trouble is—They are always looking East for contacts—don't blame 'em tho, cause the population is real thin around here on V.H.F.

How about that you Chicago Boys.

Seattle, Washington M. H. Hansen Says:

"I am very interested in the higher frequencies and feel there is a great deal to be accomplished above 50 mc.

There is getting to be quite a bit of activity here on 6 and 435 mc.

I would be interested in knowing if you have any list of stations out of this immediate area that are transmitting on 6, the time they are on, beam directions and frequencies. We have a 5 element wide spaced beam up for 6 and are adding another 5 element to it."

I can vouch for plenty of six meter activity in Seattle. Helen has worked a basket full of them from here.

California/Nevada Mel (K6CNM) has good news for Nevada seekers.

"Would you please give notice in your VHF column that K6CNM/7 and K6ILY/7 will be operating in Nevada during Easter Vacation? We'll be on 6 meters located near Lake Mead."

"Don't be surprised if you hear K6CNM/7 Walkie Talkie TBY. I've got two of them converted and Art, K6ILY, has one."

Plenty of fellows will be listening for you, Mel.

Pennsylvania Fred (WN3HWU) wants to turn carpenter.

"I saw the picture of you and your shack in CQ and I like your set up. Would you send me the dimensions of your operating table? It is ¾ in. plywood?

When my XYL saw you she thought you were Beryl Ives. Hi. Hi."

The top of the operating table is a standard 4 x 8 foot sheet of ¾ plywood. Pedestals with doors were made from a 4 x 8 sheet of ½ inch plywood. Additional material included 2 eight foot 2 x 4's and 2 eight foot 1 x 4's. Construction time one long day. Shellac and varnish courtesy of XYL. Total cost $35.00. (Anyone for plans?)

Michigan Herb (K8CIC) Chocolate ice cream on watch.

"Here we are reading all the letters from the V.H.F. gang and tuning for them at the same time. Sure enjoy them.

How about tuning up and calling up this way? O K I am listening every day 10:00 A.M. to 16:00 E.S.T.

I swing the beam 360° every half hour on schedule. Have worked 18 states since we moved up on 6 the 1st December 56.

Listen for me, and drop a line if you hear me and can't make Q.S.O."

I hope you call a little too, Herb. Can't have too many fellows listening.

Olympia, Washington Six meter man, Gene, (W7UVH) writes:

"Just want to let the six meter men know they can pick up Washington State on band openings by checking 53.29 MCS or by putting out a call on that frequency during a band opening into this area. We have in the Puget Sound area now about 25 stations. Several base, running up to 100 watts and ground planes. There are about 15 to 20 Mobiles all F.M.T.R., 50 watt xtal controlled. We'd by Vy psed to hear a "DX" Station move in and break Squelch. Some of you fellows with a gonset VFO and NBFM try it sometime for some fast contacts. 24 hour monitor too."

Glad to hear from you, Gene.

Hanover, Pennsylvania Mark Lawyer (W3FTL)

"I would like to know if there are any boys on 220 M.C. around York, Pa. and vicinity. Have a 15 watt rig on 220 MC. and a 12 ele homebuilt array.

I am interested in buying some 50 mc crystals.

There is DX on 6 meters because I heard it. HI."

I've heard tell of a little DX on six myself, Mark.

London, England. *John (G6CL) (General Sec'y and Editor of R S G B Bulletin) sets us straight on U K call areas.*

"May I put you right on a small point? In the VHF "box" announcement on P. 78 January 1957 issue of "CQ" you state that "Many East Coast stations worked into *G3 and G5 areas*". There are no such areas in the United Kingdom, in fact a G3 and a G5 may well live in the same street.

Prior to the last war the British Post Office issued G2, 3, 4, 5, 6 and 8 calls indiscriminately but since the war all new licenses have been in the G3 three letter series, i.e. G3AAA onwards. At the moment calls in the G3LAA-G3LZZ series are being issued.

There are of course *prefix areas* in the United Kingdom and these are as follows:—G England, GC Channel Islands, GD Isle of Man, GI Northern Ireland, GM Scotland, GW Wales.

Perhaps you would like to give publicity to the above information."

That's it for another month . . .

73, Sam, W1FZJ

A Simple and Positive Acting Squelch Circuit

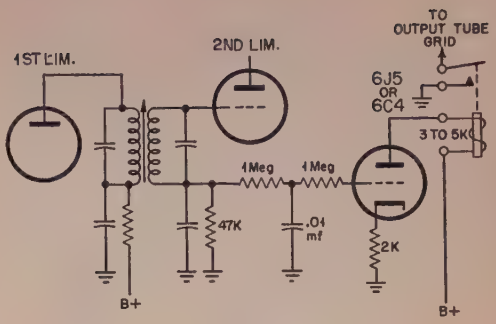


Fig. 1.

Felix W. Mullings, W5BVF
715-24th St.
Galveston, Texas

SQUELCH

for any FM

or AM receiver

If you have ever wished for a simple method for a squelch circuit for either a mobile or fixed receiver, this it it. For police, wrecker, or amateur service it will eliminate constant noise from high gain receivers. The more expensive receivers use a noise amplifier and rectifier to supply cutoff voltage for the audio stage and building this type really runs up labor and expense. This circuit goes about it in a different manner. A sensitive relay in the plate of one small triode such as a 6J5 or 6C4 is used to short the grid of the audio output tube. The triode grid is controlled by a filter network from the grid circuit of the 2nd limiter. Since this limiter voltage runs up quite rapidly when the station hits the air the resulting voltage is used to bias the triode to cutoff. The plate relay then opens and can be used to open up the grounded grid of the output stage. Normal operation of the audio stage then results. See *fig. 1* for a schematic of the squelch circuit and its hookup in the circuit of an FM receiver. Plate current with no signal is about 4 ma and when the signal comes on this tube plate current drops to zero as the relay opens up.

AM Squelch

There is very little change for an AM version of this squelch circuit. The addition of a 2 meg. pot to set the threshold level and an isolation resistor to keep from loading down the AVC circuit of the receiver. The complete circuit is shown in *fig. 2*. ■

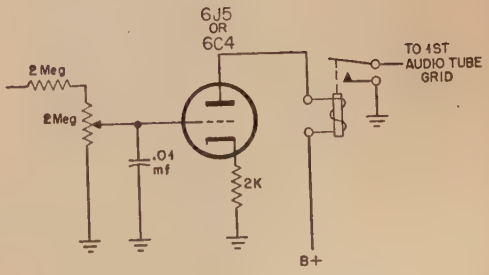


Fig. 2—The 2K cathode res is variable.

DX

R. C. "Dick" Spenceley, KV4AA
Box 403, St. Thomas,
Virgin Islands

We extend our heartiest congratulations to the following upon their achievement of WAZ:

No. 334 W2UFT Donald J. Toman 40-228
No. 335 W6ITH D. Reginald Tibbets 40-161 (Phone)
No. 336 W8KML Fred J. Pichitino 40-240
No. 337 KL7UM Brannon C. Casler 40-151

Of special note is the accomplishment of W6ITH who is the first W to make PHONE WAZ. W2UFT is the 8th W2 WAZ, W8KML is the 13th W8, KL7UM is the first KL7 and W6ITH is the 121st (!) W6.

We also welcome the following newcomers to the HONOR ROLL:

W9VIN, Ray,	39-202	I1IZ, Armando,	39-152
W4IMI, Ken,	39-201	OK3MM, Jan,	39-151
VE7YR, Harry,	39-187	W4FYI, Jim,	38-152
W6SIA, Hal,	39-180	W1RB, Earle,	37-179
OK3HM, Jozo,	39-162	W2PZI, Dick,	37-142
W2HO, Bill,	36-164	W3WGH, Bob,	35-134
W3MOT, Seymour,	36-131	W8QJR, Frank,	36-209 Phone
W3EH, Reg,	36-112	F8CW, Jean,	35-165 Phone
KA5ZS, Zane,	35-69		

Courtesy W9FKC, Crescent Bronze Co.

DX Notes

Reg, W6ITH, again put FS7RT and PJ2MC on the air. Starting on January 28th, and lasting about a month, twin set-ups (KWS-1, 75A-4) were used on the French and Dutch sides of the island. Operation was mostly SSB on 14, 21 and 28 mc with a little cw on the side. About 350 contacts were made in the first half of the phone contest alone. Reg planned to also operate from the French island of St. Barthelmy with the possible call of FZ8RT but, as we write, permission had not yet come through from Guadeloupe . . . Bill, W2SKE, was granted a license as HI8SKE, during his visit to HI-land in February. Many phone contacts were made from his QTH at the Embajador Hotel. He returned to NYC on February 11th. See QTH's . . . VK3KB reports a QSO between VK9XK and C1KAA on 14007. The latter gave his QTH as Peking . . . ZL5AA, Antarctica, may be found on 14160, A3 . . . After extended negotiations Rundy, W3ZA (ex-KV4AD), leaves for Viet-Nam in April. Ham privileges, a part of the contract, are still uncertain at this time but we feel that these may be obtained and Viet-Nam opened for amateur contacts. Rundy is taking a KWS-1 with him and travels to 3W8-land via KP4 and Europe * * * Good luck ! . . . We are happy to announce that Don, K2AAA, of ELDICO, has consented to furnish Cesar, EA9DF, with an SSB-100A rig for use in IFNI. This transmitter should reach EA9DF, at his Rio de Oro QTH, early in March and he plans to be on from IFNI as soon as possible thereafter. SB and cw will be used and KV4AA will handle QSL's for Western Hemisphere contacts . . . LA1VC/G is expected to be heard from Antarctica . . . Via F9RS we hear that the new French Mission is now at Adelie Land, Antarctica, and operator Rene Merle should be heard signing FB8YY. QSL's go via the REF who will

receive Renes log via QSP from Madagascar . . . New hope for Kerguelen contacts also comes via F9RS who states that a future French Mission to this QTH will be active on the ham bands as it will include Pierre Bureau, FB8CC, who did considerable operating from FB8XX in 1955 . . . UC2AA reports that UAØOM was on from Tannu Tuva (UAØOM/T) for one day about five months ago. Ben may join the UP2AS/UA1KAI expedition to Tannu Tuva this Summer . . . Carl, KT1UX, leaves for DU-land shortly while KT1EXO returns stateside . . . FX7GE has been reported on 7172 with a DX-35 rig . . . Bill, KV4BB, may have operated from the British Virgin Islands during the second half of phone contest. Plans called for sideband only. . . . Jon, WØTWL, possibly accompanied by WØFNN, hopes to DX'pedition to Socorro Island some time after July 1st. Plans hinge on whether transportation can be provided between Socorro and the Mexican mainland plus licenes. We understand that there are government sailings to Socorro on a bi-monthly basis and anyone with an "in" with the Mexican Government might be able to help Jon accomplish this trek. . . . Sgt. Bob Cheesman writes from Christmas Island (ZC3) that the British services have given permission for the operation of amateur stations at that QTH and as a result VR3E and VR3F are now active and Bob will soon be on with VR3G. All these stations hold G calls with Bob having operated from G3KDE, 5A1TQ and SU1MQ. QSL's should go via Honolulu as per the QTH column . . . ZC5AL has been heard on 14040 at 1030 GMT. ZC5JN should soon be on again with a new transmitter. . . . YV5FL reports he overheard a cw QSO between YV5AE and ZD9AF in Spanish in which ZD9AF said he was located in Venezuela (!!) . . . W8QXW reports CR4AH on every evening, 2300 GMT, phone, 21215 kc . . . LX2GH has been on in Luxembourg. QSL via DJ2PQ . . . KC6AK operates from Eastern Carolines and has been heard around 0630 GMT on 14050. He is ex-KH6OK . . . UL7KAA, op Boris, has been appearing near 14036 at 1200 GMT. He runs 100 watts and drifts 4 kc each transmission. QTH Alma-Ata. . . . Hank, ZS6WG, has applied for license to go to Swaziland and may shortly be heard from ZS7 on SSB . . . ZD8JP, 14020, is OK. He is an Englishman on Ascension Island . . . AP2RH is on most days at 1200 GMT. He leaves for England in July . . . Jake, W8FGX, visited the Br. Virgin Islands with hope of getting on the air with VP2VA's old rig. He found that new owner had dismantled rig just four days before! . . . LZ1AF advises that there has been an agreement between the HA and ZA governments regarding a DX trip, by HA hams, to Albania. This was due to take place in May or June. It is not known if the recent events in Hungary have affected this plan . . . We hear that FW8AA is working on a new transmitter and will be on again soon . . . OH2MK with OH2LP, and possibly OH2YV, planned to be on from the Aland Islands from 1600 GMT, Feb. 24th, to 1930 GMT, Feb. 27th, operating phone and cw. The call was OH2AA/Ø which belongs to the local club in Helsinki. It was also understood that OH2WI/Ø might be on for the first half of the CW contest from the same QTH . . . ET2RH is active on 7, 14 and 21 cw practically every day at varying times. Bob says conditions not too good there and signals from Pacific ocean area and South and Central America are practically nil. Other ET stations are: ET2US Club station mostly 20 phone, ET2PA phone and cw on 14, 21 and 28, ET2LB 14 cw (leaving soon) and ET3AF/2 14 and 21 cw . . .

Starting out on their January trip to the Aland Islands are (r to l) Sven, OH1RT/Ø, and John, OH1ST/Ø. 535 contacts were made, 301 of them W's. 32 countries were worked and WAC was made by both ops. Approximately 40 hours were spent on the air.

Sven and John during their stay on Aland in May 1956.

DX'ploits

Chas, W-FH, leads off this month with the addition of FW8AA and OH1RT/Ø for a 273 total. . . . Howy, W2AGW, also adds OH1RT/Ø plus ZC3AC to hit 266 while Jim, W8JIN, is right behind, with 265, thanks to VK9AJ and ZC3AC. . . . Jesse, W3KT goes to 263 with OQØDZ, IT1CFN, VK1RW and XW8AB. 29 additions bring his "phone only" total to 199. . . . Van, W9HUZ, adds OQØDZ, IT1AGA and VP2VE for 256 as Mike, W9FKC, reaches 242 with IT1TAI, OH1ST/Ø, UJ8AF and UM8KAA. . . . Fred, W8KML, sub-

(Photo courstey K6SSJ)

LA5YE, Hallvard Heggtveit, of Bekkestua, Norway.

mits new lists for 240 CW/Phone and 218 Phone only plus WAZ No. 336. . . . Bob, W5GEL, submits new list jumping him from 212 to 235 while Thor, W6LN, goes to 223 with UR2AK, FL8AB, PJ2ME and IT1AGA. . . . Murel, W8SDR, ups from 213 to 223 plus 47 new ones on phone for a 169 total as Leo, WØNTA, adds 29 to reach 216. . . . Clay, W6LGD, nabbed GC2FZC and IT1AGA for 203 as Dick, G3DOG, goes to 195 with new list. . . . Takeo, JA1CR, hits 175 with such as VQ1JO, VQ5GC, UR2KAA, UQ2KAA, UP2KBA, UM8KAA, UJ8KAA, AC3SQ and OA4BW while Bill, W6DVB, adds ZB1AY and PZ1BS for 106. . . . Bill, W5ASG, hits 268 with OH1RT/Ø and moves to 203 on phone with VR6AC, M1B, VKØCJ, UB5KAI and UC2KAB as A1, W2WZ, ascends to 255 with OH1ST/Ø and UH8KAA. . . . Stan, W1CLX, adds SM8KV/LA/P and VR4AA to reach 252 while Joe, W8UAS, hits 251 with UM8KAA, OH1RT/Ø and SVØWE. . . . Howy, W2QHH, made it 248 with UL7KBA as Buzz, W9ABA, nipped SVØWN, UG6AB, UH8KAA and UM8KAA for a 244 total. . . . Gus, W2HMJ, reached 242 with UM8KAA, VK9AJ and OH1ST/Ø while John, W4HA, thanks to ZD2GWS, UC2AD, UF6PB and UH8AA, hit 234 phone/CW and 213 phone only. . . . Rip, W4EPA, moved to 225 with UG6AB, OH1ST/Ø, CR1ØAA, UM8KAA, VK9AJ and CR9AH as Vic, W1TYQ, keyed with ZD9AE, UH8KAA, UM8KAA, OH1RT/Ø and ZS2MI for a 222 total. . . . Bill, W8KPL, ups to 221 with such as YA1AM, FB8BF, UJ8AF, PJ2MC and VQ8CB while Pat, W2GVZ, made it 219 with OH1PI/Ø and SV1LP. . . . Bob, W6DBP, slid to 211 with 19 additions which included EAØAC, UD6BM, ZS9R, OY1R, UF6KAF and ET2LB as Wally, W7AJS, snagged LA9LF/P, ZD1FG and G3IDC/VS9 for 207. . . . Paul, W9KXK, made it 194 with UJ8KAA and added UAØKQB for his 39th zone while Carl, W4NBV, went to 183 with OH1ST/Ø, UG6AB, UP2KBC and YA1AM. . . . Mickey, W8YIN, hit 221 with VK9AJ and CR5SP as Bill, VS1GX, moved to 167 with new list. . . . Pete, K2OEA, rose to 159 with

HR1JZ, VS2CR, VP5BL, ET2RH and OH3RA/Ø while Aleta, K6ENL, keyed with GC2FZC, FQ8AF, ZC4GT, UQ2AB and VP2LH for a 152 total. . . . Juan, KP4CC, hits 217 with PJ2ME, VR3B and VK9AJ as Joe, WØPGI, goes to 148 thanks to OQ5CP, CR4AH, GC2FZC, VQ5GC, ZD6BX, VQ6LQ and UR2KAA. . . . Sheldon, W5VIR, keyed with VU2KM and ZD9AF for 186 while Nelson, W8UEP, rises to 126 with such as FK8AS, YA1AM, VQ2IE, TA1FA, FY7YE, 5A2TY, CR7DQ and ZE3JO. . . . Jean, F8CW, snagged CR9AL, TF2WBJ, JZØPB, VR2BC and HR4WH for 172 on phone/CW and 165 phone only. . . . Chas, W6PJ, submitted new phone list with a 196 tag while Willard, WINWO, nabbed FS7RT for No. 225 on phone. . . . John, W3UXX, adds two zones with UAØSK and UL7FB plus KC6KU, CR1ØAA, YN1LB, UA6UI, UR2KAA and UA4PL for a 145 total. . . . Alan, VK3CX, hooked OH1RT/Ø for No. 229 while Doug, VK3FH, grabbed ZD3A for No. 230. . . . VS1GX is on 3506 daily from 1415 to 1530 GMT and has worked 3W8AA, AP2AH, K2DGT/6, W7JC, W6SAI, OK1MB, 4S7MR, K6NCT, W6ZAT and VK6EJ on that frequency. . . . W1EOB was first QSO for VKØAB while W8DUY nabbed ZL5AA for the latters first W. . . . Late ones at W6VSS were CT3AB and EA6AW which brought Dales total to 222. . . . W7KSA's No. 139 was KV4AA while Ed, W6UQQ made it 200 with IS1FIC. . . . Clark, K4IIC, on with a general ticket since December, went to 41 with such as XE1PJ, PJ2ME, PY8TS and OA4CC. . . . Geo, W9BEK, with 65 watts, hit 91 with such as CR6AH, ZS3F, FY7YE, ZB1AJX, KT1WH, BV1US, 4S7GE, VS2DQ, CR4AS and GI3KVQ. . . . Hiroji, JA1CJ, ups to 181 with OY7ML, HS1VR and CR5SP as Mike, K6ICS, makes it 41 countries and 22 zones with LU3ZS, KZ5JS, VP1EE and K4LBP/VE8. . . . Best stuff with Lloyd, W6KG (ex-DL4ZC), in January, was LZ1WD, I1BLT/T, SL3AG, UAØKHG, UA3KET, VP7NI, YO3FT, KC6AK, UL7FA, VR3B and VK9AJ. . . . Latest with Pete, W1BPW, is EA8BF, 9S4AZ, VP5BL and UA1KAE while Mac, W8QXW, reports 7 mc very hot for Europe with pactically all countries represented. . . . W9EHW finally pulled in his QSL No. 100, from UR2AK.

160 Meters

(W1BB 160 Meter Bulletin)

The December 16th test started with WWV sending N7 after NE storms on the East Coast. Noise level was not bad. At 0520 GMT G5JU showed up and worked W1BB and W3RGQ. At 0600 G3PU contacted W1BB. At 0645 GM2BUD came through weakly to contact W1BB and stayed audible until 0800 with signals averaging 349. W7VS was on 1901 kc but not heard on the East Coast. W1BB's signals were reported peaking 449 at PY3AJK and were also heard in Malta, Liberia and Scotland. Active W stations were: W1BB, W1EFN, W2JPW, W2GGL, W3RGQ, W3CLI/3, W3HGP, W3WR, W5SOT, W7VS, W8BMJ, W9PCO, W9NH, W9PNE, W1DTW, WØIFH, WØNWX and KØHEM. Known DX activity stemmed from G3PU, G3KTJ, G3ERN, G3IHH, G3IBT, G3IQM, G3CSZ, G5JU, G6GM, G6BQ, GM2BUD, HB9IM, OK1KDO, OK3KAS, DL2UY, DL2FF, GW3HFG, OK1KX, PY3AJK and ELIC. Skip conditions during the December 23rd test were NG and no DX was heard. . . . Congratulations to Ed, G3PU, who now has his QSL's in for WAC on 160! . . . OZ7FG reports 160 not allowed in Denmark but he is trying for special permission. . . . The December 30th tests, which might have been eventful, were "washed out" by a cold front with rain, high winds and snow. QRN was S8 to 9. Nevertheless contacts were made between W3RGQ and G5JU/G3GKQ and between W1BB and

Addresses

ET2RH—M/Sgt. Robert I. Hall, RA19354041, MESSD (9434) APO 843, N.Y. N.Y.
ET3RL—Box 399, Addis Ababa, Ethiopia.
FF8AJ—(New QTH) Yves Bijoult, Ouadadougou, Haute-Volta, French West Africa.
FG7XE—"George," Raizet Airport, Guadeloupe, FWI.
HI8SKE—Via W2SKE, Bill Leonard, 430 East 63rd St., N.Y. N.Y.
HK5CH—"Herman," P.O. Box 8, Cali., Colombia.
K6VUH—(ex-W5MET) Dick Kemp, 12802 Izetta Ave., Downey, Calif.
KC6AK—(KH6OK) Bernard Diffen, US Weather Bureau, Truk, Eastern Caroline Is.
KV4BV—John Newman, Box 1386, St. Thomas, Virgin Islands.
LZ1WD—"Kosta" Box 520, Sofia, Bulgaria.
OKINAWA RADIO CLUB—APO 239, Box 175, San Francisco, Calif.
VEØND—Via VE1KW, Apt. 25, 313 Dutch Village, Halifax, NS, Canada.
VKØAB—(Vestfold Hills, Antarctica) Via VK2EG.
VP9Y—Jim Amos, Pitts Bay, Hamilton, Bermuda.
VR3E, VR3F, VR3G—(Christmas Island) Via Sgt. Bob Cheesman, 4038613, Sgts. Mess, RAF 160 Wing, British Forces P.O. 170, Via Honolulu, T.H.
VQ3SS—Box 97, Dar-es-Salaam, Tanganyika, East Africa.
VS2DQ—(New QTH) Jim Pershouse, Sungei Roya Est. Langkowi Is., Kedak, Malaya.
W5CFG—(New QTH) Dick Silverman, 5969 So. Birmingham, Tulsa, Okla.
5A2TY—542 Engr. Co. APO 231, N.Y. N.Y.
Thanks to West Gulf Bulletin, W6GMF, W7ZOH, W2HQL, W8QXW, W6YY and F9RS.

W7GBW, George Wise. of Portland, Ore. looks happy, and why not, the 75A-4 is an unexpected Xmas present from the XYL. Rig consists of a VIKING which drives a 45ØT final, remotely controlled in the attic. The antenna is a 3 element close spaced beam (11 foot boom) 80 feet up. George was licensed in 1936 and holds WAZ No. 61. His present DX total is 249 with 237 confirmed.

(Photo courtesy Willamette Bulletin)

Audun Johnsen, LA6IF, of Notodden, Norway, was one of the last to contact Budapest during the Fight For Freedom there. The contact was made on 40 meters with his 30 watt xtal controlled rig, a contact he will never forget.

G3GKQ. . . . January 6th was clear, calm and quiet but NO DX was heard! . . . Same goes for January 13th except extremely high noise level ruled out any DX QSO's. . . . On January 20th the band opened up around 0600 with G5JU working W1BB, W1PPN, W1VDB and W1LYV. G6BQ and G3GKQ were heard weakly but made no contacts. . . . On February 8th Fred, VP2LU, came on for a new 160 country and another "first" was made when he contacted W2QHH at 0953 GMT followed by a QSO with W1BB. VP2LU ran a DX-100 rig at 80 watts and peaked 559. . . . January 27th test conditions seemed good but not a single Europrean was heard. YN1AA showed up at 0525 and worked W1BB and then went QRT. . . . The February 3rd test was the best since December 12th with the following QSO's resulting to 0730 GMT: W1BB with G3PU/G5JU/G6GM/G3LOE, W1PPN with G3PU/G5JU/G6GM/G3LOE/G3ERN/G3GGN/G3JVI, K2ETJ with G3PU, W3RGQ with G3PU/G3LOE, W1LYV with G3PU, W2GGL with G5JU, K2BWR with G5JU, W9PNE with G3PU, K2KWP with G5JU. K2KWP's signal was reported 589 by VP3AD who also heard W1BB, W3LOE, W2GGL, W9CVQ and W9MGL at good strength. . . . G5JU advises that YU stations may now use 160 with special permission. . . . February 10th test went off fairly well with QRN picking up around 0730 GMT. Contacts were made as follows: W1BB-G3PU/G5JU/G6GM, W1PPN - G3PU/G6GM/G5JU, W1ERX-G5JU. When one bears in mind that G stations are limited to ten watts for these tests all above participants deserve considerable credit for these accomplishments.

HONOR ROLL ENDORSEMENTS

(To February 15, 1957)

W1FH	40-273	W4HA	39-234	W3UXX	37-145
W2AGW	40-266	W4EPA	39-225	W7HKT	37-144
W8JIN	40-265	W1TYQ	39-222	W2PZI	37-142
W3KT	40-263	W8KPL	39-221	W5VIR	36-186
W9HUZ	40-256	W2GVZ	39-219	W9NN	36-168
W9FKC	40-242	W6DBP	39-211	W2HO	36-164
W8KML	40-240	W7AJS	39-207	W3MOT	36-131
W5GEL	40-235	W9VIN	39-202	W8UEP	36-126
W2UFT	20-228	W4IMI	39-201	W3EH	36-112
W6LN	40-223	W9KXK	39-194	F8CW	35-172
W8SDR	40-223	VE7YR	39-187	W3WGH	35-134
WØNTA	40-216	W4NBV	39-183	KA5ZS	35-169
W6LGD	40-203	W6SIA	39-180		
G3DOG	40-195	OK3HM	39-162	PHONE ONLY	
JA1CR	40-175	IIIZ	39-152	W6ITH	40-161
KL7UM	40-151	OK3MM	39-151	W8KML	39-218
W6DVB	40-106	W8YIN	38-221	W6PJ	38-196
W5ASG	39-268	CS1GX	38-167	W3KT	37-199
W2WZ	39-255	K2OEA	38-159	WINWO	36-225
W1CLX	39-252	K6ENL	38-152	W4HA	36-213
W8UAS	39-251	W4FYI	38-152	W8QJR	36-209
W2QHH	39-248	KP4CC	37-217	W5ASG	36-203
W9ABA	39-244	W1RB	37-179	W8SDR	35-169
W2HMJ	39-242	WØPGI	37-148	F8CW	35-165
WAZ TOP FIFTY		W6EBG	258	W1CLX	39-252
W1FH	273	W6TS	258	W8UAS	39-251
W6AM	271	G6ZO	256	W8JBI	39-250
W6AOA	270	W5KUC	256		
W6ENV	269	W9HUZ	256	WAZ AND 200 PLUS PHONE	
W6SYG	268	W7AMX	255		
W6MX	267	W6SAI	255	PY2CK	40-244
W8KIA	266	W7GUV	255	VQ4ERR	40-241
KV4AA	266	W6TI	254	G8IG	40-199
ZL2GX	266	WØYXO	252	W6ITH	40-161
W2AGW	266	CE3AG	252	W6DI	39-230
W6DZZ	265	W8HGW	251	W8KML	39-218
W3GHD	265	W8BRA	251	XE1AC	39-217
W8PQQ	265	W6GFE	251	W6AM	39-215
W8JIN	265	VK2DI	250	W3LTU	39-206
W7VY	264	GM3DHD	250	W9RBI	38-240
W3JNN	263	W8NBK	249	W9NDA	38-225
W6SN	263	W1GKK	248	CE3AB	38-214
W6CUQ	263	W6NNV	248	W2BXA	38-211
W3KT	263	G6RH	247	W3GHD	38-209
PY2CK	262	W6BUD	247	W6KQY	38-207
W9VND	262			W3JNN	37-234
W6VFR	261	250 PLUS		G3DO	37-200
W9NDA	261			WINWO	36-225
W6VE	260	W5ASG	39-268	W1MCW	36-223
W6ADP	260	W9RBI	39-257	W4HA	36-213
W8BHW	260	W2WZ	39-255	W8QJR	36-209
W6MEK	259	W5ADZ	39-254	W5ASG	36-203
W3EVW	259	W3EPV	39-252	CO2BL	35-210
W2BXA	258	W9LNM	39-252		

Last complete HONOR ROLL appeared in the January issue.

Next complete HONOR ROLL will appear in the May issue.

Here and There

Ted, ex-KV4AF/K2BCK, now keys as K6UYK in North Hollywood. . . . New officers of the North Seattle Club are: W7CJQ Pres., W7LWB Veep, W7CNU Sec'y, W7YQS Treas. and W7YPV Sgt-at-arms. . . . W2DLO is now back at K4IXG, Fla. . . . Lloyd, DL4ZC with xyl Iris, DL4ZB, and daughter Joy, DL4ZBD, returned to W6-land and W6KG via South and Central America. Twenty-two countries were visited, including G, PA, GD, CT, EA, CT3, VP6, VP4, VP2, PY, FY7, PZ, VP3, YV, PJ2C-, HK, HZ5, HP, TI and YN, many enjoyable personal visits were made with hams in those QTH's. All modes of transportation were encountered including ox drawn carriage! . . . Lucia, CR7LU, seeks contacts with South Dakota and Vermont to complete her WAS. . . . Barrie, K6ICQ, complains that some joker has been borrowing his call. He has received numerous QSL's from DX covering QSO's quite unknown to him. . . . Dick, W5MET, now signs K6VUH from

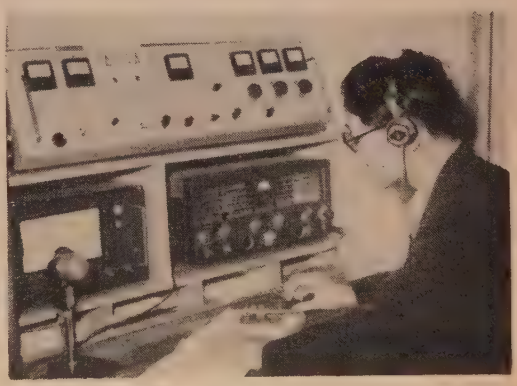
Downey, Calif. He works at North American besides attending Long Beach City College plus two nights a week at Newark Electric which limits his DX'ng. . . . Nosey, KH6IJ, is now back home after a most enjoyable stateside visit. Speaking of coincidences, negative and positve, Nosey says he was phoning W6ADP from a public booth when a guy tapped on the glass, who was it?—that's right W6ADP himself (He had seen the KH6IJ plates on the car). On the negative side, in New York, W2AGW and WØELA were in the same hotel with him at the same time, unknown to him until later! . . . KV4AA was happy to log visits from WØCO, KZ5WC, W5FGO/MM, W2SKE, K4AFZ, W8FGX and K4GDY. . . . Directing the destiny of the Ohio Valley Club are newly elected Pres. W4JBQ, V.P. W8ELB, Sec'y W4KVX and W8CGY as Treas. . . . DL7AH looks for W7 and WØ on 7 Mcs. CW daily 0600 to 0700 GMT. . . . HB9QO is new Mgr. for the Swiss USKA while HB9NL handles the QSL's.

Neat set-up of W8FGZ, Earl Ensign, Bowling Green, Ohio runs a 304TH in a grounded grid final.

Last Minute Items

KØDEX advises that he plans to DX'pedite to Pitcairn Island and will leave in May or June. Hopes to use calls of VR6AD or VR6DEX. Transportation to this remote spot is a snag that hasn't been worked out as yet . . . F8SH, Serge, will leave in April for a two year stay in Oubangui-Chari, French Equatorial Africa. He will use his old call of FQ8AP . . . Reg, FS7RT/PJ2MC, still on St. Martin (2/27/57), helped mightily in the recent ARRL DX test by dispensing hundreds of contacts from FS7RT and PJ2MC during the phone section plus same from FS7RT in the c.w. portion. Reg limited c.w. activity to the French side in deference to the c.w. operations of Vince, PJ2ME, on the Dutch side. Plans for operation on St. Barthelmy, as FZ8RT, seemed to have bogged down in red tape . . . Bob Ford, ex-AC4RF, has now completed his book "Wind between the Worlds" and it was due to be published by the firm of David McKay on April 29th. Price is four dollars and we imagine G2MI would be glad to handle inquiries . . . We confirm that VP2VG, Buck Island, British Virgin Islands, was definitely due to be on from March 7th to 12th with a KWS-1/75A-4 combo. Activity mostly SB. QSL to KV4BB . . . The Swiss H-22 Contest will take place on the 18th and 19th of May . . . Oscar, LU8BF, is now active from Thailand, signing HS1MQ, he has been worked on 21235, A3, around 1800 GMT. QSL go via LU Bureau . . . OH2AA/Ø operated from Aland as scheduled and signed off on Feb. 28th. Same for OH1SS/OH1ST who signed OH1NA/Ø in first half c.w. contest. Appearance of OH1ST/Ø was also set for March 8th and 9th . . . W2AGW reports that W2HC left for FE8-land and took along a KW and Telrex antenna. He will be there for two months on SB and CW . . . W2CVJ and W2HQL plan trip to the Cayman Islands, VP5, in July . . . Art, K4LIB/FQ8, was heard

(Continued on page 104)



JA6AA, "Yasu" Itabashi, Fukuoka City, Japan runs 400 watts to an 8JK antenna.

Left to right are DX'ers YO3ZR, YO3RF and SP6XA as snapped in Bucharest last October.

SURPLUS

Donald L. Stoner, W6TNS
Engineering Consultant
P. O. Box 137
Ontario, California

To give me time to catch up on things only letters are answered this month. The pictures shown below are of the Six Meter Transceiver; construction described last month on page 65. Next month features conversion of the RCA ATK and ATJ series of TV cameras for amateur use.

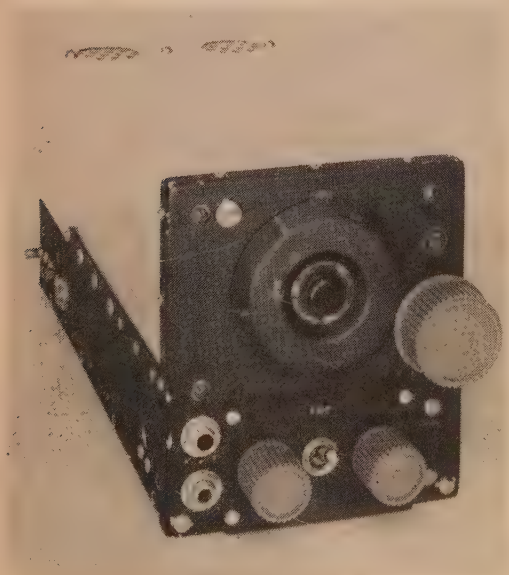
Letters to the Surplus Editor

Dear Don: I have been a ham for three years now and I have been interested in UHF for some time. Two older boys and I are trying to get on 420 TV. We have several BC-645's, an ASB-5, and 30 watt surplus TV transmitter and several other triplers. We haven't been able to find much information on amateur TV. About the only information we could find was in the November 53 or 54 QST. Diagrams for a camera and a sync generator were given. The main problem is the $200 for the 5527. (*No problem—They are only $150, Ed.*) We would appreciate any information you could give us. If there is any conversion info on this 30 watt TV transmitter, we would like to get ahold of it. It uses 4—8025's. I am 16 years old and a senior in high school. I hope I can meet you personally or talk to you on the air sometime. Very truly yours, Barney Capehart, W5DCA

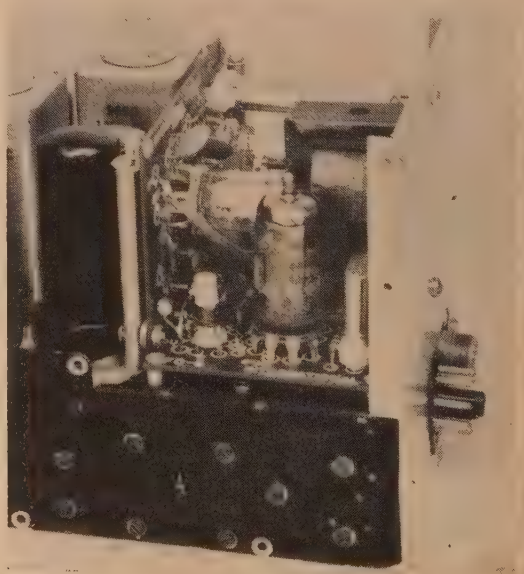
Thanks for the interesting letter Barney. The conversion information that you requested is available by writing "West Coast Ham Ads" 10517 Haverly St., El Monte, California. This is a monthly publication that appears on the West Coast and back issue contains a conversion article by yours truly. Best 73's Don

Dear Don: I recently acquired a piece of equipment marked RT-45 ARQ-1. This is a transceiver covering 14 to 50 mc with the receiver and transmitter ganged and tuned together. It is complete with 110 volt, 400 cy power supply. The transmitter uses an 807 in the final and a 6AG7 driver. I find very little information on this and wonder where I could get a maintenance manual on it. Some of the fellows out here are using them on 10 meters now, by providing a power supply. There seems to be quite a few available down here and they might work out to be a nice portable unit for 4 of our bands. I would like to have any information on them, as the circuit seems to be a little odd. Dave Baxter, W5KPZ, P. O. Box 3071, Tyler, Texas

Front view of the Command Set receiver Six Meter transceiver. Note the close spacing of the operating controls. The shiny button is a plug that was used to fill the hole vacated by the antenna post.



Right side view of the dynamotor area. The Triad A-5X microphone transformer was mounted on the rear panel between the 5763 and the 6U8 tubes.



Hummmmm, sounds like an FB rig for the conversion you described. To the best of my knowledge, there are none available on the West Coast, but if I can get one we'll see what we can do to oblige you with a conversion.

I read your article on converting a BC-645. I am in the middle of such a conversion, but before I go any further, I was wondering what you would recommend to increase the power output. I understand the WE-316 can be driven up to a higher point to increase its power output. No doubt you have considered this when you were making your conversion. Sincerely Ernie, W7YIF, 2784 Delsa Drive, Salt Lake City, Utah

Dear Ernie: I do not think that it is possible to raise the power output without many complications. To obtain more power out, you must put in more power. This means a bigger power supply and not enough room on the chassis. Also, more input power means more modulation power and again more room is needed. Therefore, I would not consider modifying the basic transceiver too much.

Dear Don: After reading the TBY "conversion" in the December CQ (page 19), I was wondering if the TBY-6 fell in the same class? (anchors, door stops, etc.) or is there some way to use it on the air? Barry, KN6SQR, Lo Angeles, Calif.

Dear Barry: Don't let them kid you. The TBY's work fine when they are Xtal controlled. I have some interesting conversion data on them and if the Editor will retrieve his TBY from the end of the pier, a conversion might appear in this column.

Dear Don: I have a good 6325 vidicon and desire to put a TV picture on 420 mc with it, or swap it to someone who will. 73, Wes Miller, W5QNK, 5412 Hensley Drive, Fort Worth 15, Texas

Dear Wes: As you probably know, the deflection components for the vidicon are rather expensive, and probably will be until RCA comes out with an amateur vidicon. You might be interested in next month's surplus conversion article on the RCA ATK and ATJ series of war surplus television cameras. These units produce fine pictures at less cost than an inexpensive communications receiver.

Raul Horacio Diaz, LU6EF, 39 No. 126 LaPlata City, Argentina would like to obtain information on a transformer that he has with the following inscription #901892-501. There is no other inscription.

Eliot Underhill, 100 Clifton Ave., Los Gatos, Calif., would like to obtain a manual or schematic on the Navy RAL-6 equipments. He would also like to obtain a CRV-20181, which is the power supply.

G. J. Grey, VE4BM, 502 Winchester St., St. James 12, Manitoba, Canada, would like conversion information on the Bendix TA-12C.

Bill Pierce, P. O. Box 892, Lawton, Oklahoma, would like information on a high frequency receiver, model AMR300, serial #23749, Code SC-CD-312-44 built by Standard Telephones and Cables Ltd., Sydney, Aus.

J. D. Akin, P. O. Box 50, 2nd Recon. Task Squad, Barkschafer AFB, Shreveport, La., would like information on a Navy receiver, model CMX-46159. Input 12 volts at one amp., 1500 to 12,000 kcs. It is part of the TCS-12 radio equipment.

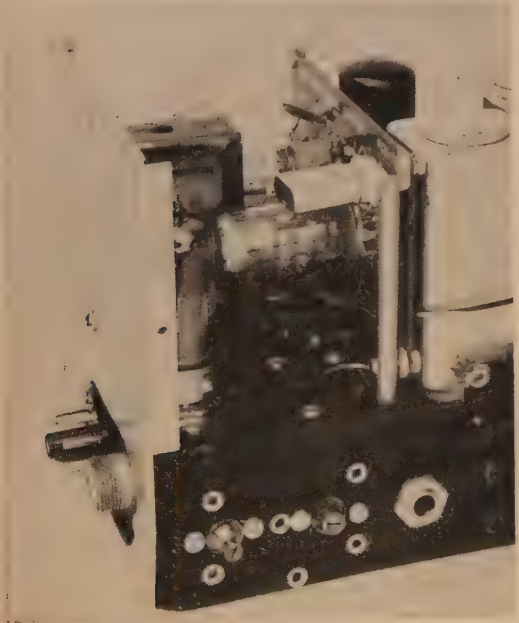
B. G. Baker, K4AKB, 557 Park Drive, N.E., Atlanta, Georgia, would like information and schematics on a T91/VRC4 and an R41/VRC4 transmitter and receiver, respectively.

Waldo Longwell, Jr., 518 Euclid Avenue, Elmira, N. Y., would like information on a type CRV-46045 Model RAL-5 receiver. Frequency range .3 to 23 megacycles.

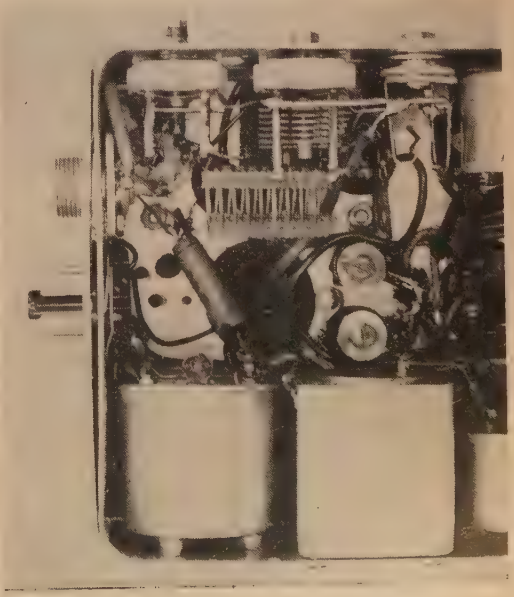
Winfield E. Davis, Murry Avenue, Merchantville 10, N. J., is trying to locate a schematic of the BC-AR-429 receiver.

I need help also. The above letters represent only a few of the requests for information that I receive. If any of the readers have schematics, manuals or information on surplus equipment that is not usually found in the regular sources. I would sincerely appreciate obtaining them so that I can continue answering the readers' requests. Best 73's, Don, W6TNS

Left side view of the dynamotor area. Note the method of mounting the FCV-1 converter on the ¼ inch pillars.



Under chassis view of the dynamotor area showing the layout of the transmitter components. The Z-50 r-f choke is connected directly from the plate connection of T-1 to the plate of the 5763.

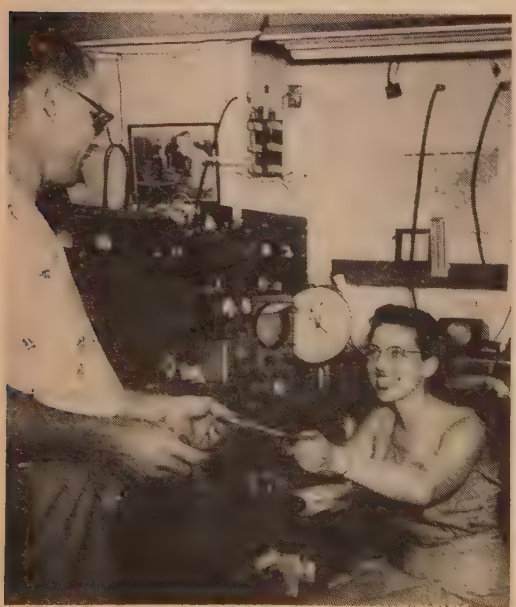


YL

Louisa B. Sando, W5RZJ
U. S. Indian School
Santa Fe, N. M.

W3CUL, Mae Burke

K9AMD, Carole, NCS of the After-The-Net Net, at the rig of W9WHL during ATNN hamfest last summer. Photo by K9AXS, Golde.



Edison Award to YL

Our sincerest congratulations to W3CUL, Mae Burke, who is the recipient of the Edison Radio Amateur Award for 1956. This coveted award is sponsored annually by the Tube Department of the General Electric Company. The announcement was made Jan. 24, 1957 when Mae received a phone call from the judges at Washington, D.C. informing her that out of 50 nominees from 21 states she had been chosen unanimously for the honor.

The actual presentation will be made at a dinner-ceremony in Washington on Feb. 28th. But at this writing (mid-Feb.) Mae is receiving congratulatory messages from Hams all over the country, was a guest on Arthur Godfrey's TV show show on Feb. 20th, and no doubt will receive much more recognition for her selfless devotion to Ham radio and handling third-party traffic. For more details of W3CUL's phenomenal BPL record and 25 years as a Ham, see "Long-Time YLs, Chapter III," CQ, Jan. 1957 (p. 87).

Dayton Hamvention

Convention season rolls around again-starting it off with a bang will be the Dayton HAMVENTION scheduled for April 6th at the Dayton Biltmore. According to W8MDK, Ruby, chairman of the women's activities, there will be much of interest for the gals. Following registration there will be a coffee, YL get-together and tour of the exhibits. The luncheon will be followed by a talk and display of ceramics by Mrs. John McMillan. Late afternoon calls for a bingo party for the XYLs and a forum for the YL ops, to be topped off by the evening banquet.

Speakers at the YL round-table will be W9RUJ, Mary, NCS of the 20-meter Tangle Net, and W8ABM, Ruth, who from April 1955-56 set records as a Novice, with WAC, WAS, first in Ohio Section Round-Up, top YL in Novice Round-Up, and Novice award in Ohio Section in SS. Another speaker will be W8HPP, Rita, who started with a Novice license at the age of 12 (18 now). The originator and NCS of the Ohio Phone Net, she also is a veteran cw op having worked up to 40 WPM as a Novice.

7th Midwest YL Convention

The 7th Annual Midwest YL Convention is scheduled for May 24-26 at the Autorama Motel in Flint, Mich. It is being sponsored by the Genesee County Radio Club with W8ATB, Esther,

W4ETR-AF4ETR, Mary Sturkey, as she received a MARS Certificate of Merit at Bolling AFB for her work as NCS of the Hq. Command MARS. Hq. Command has four MARS nets operating in the Washington area. During the past two years Mary's efforts have increased membership from about 25 to 175. Mary, who also is treasurer of WAYLARC, is ex-TA2EFA, and has entertained the club with slides of life in Turkey and visits to the Middle East.

as chairman. All YLs are invited. Registration begins at 9 a.m. Friday, followed by luncheon and a tour of one of the factories. Evening calls for a buffet supper and a "QRM Party." Saturday morning is reserved for shopping and following luncheon there will be informal talks and showing of pictures. Saturday evening there will be a banquet and entertainment for all; bring the OMs. Sunday: church of your choice and tour of Ham

W6HMD/9, Letha Johnson, has made her OM, W6AAQ, a Chief in the Navy, the envy of several thousand men at a U.S. Naval Station in Newfoundland by their daily skeds via club station K3NAK/VO2. Licensed since 1949, Letha's rig is a Ranger with an NC-183, and her widespaced 3-element beam pointed toward Newfoundland is kept warm by 29,080 kc RF every p.m.

When OQ5FH, Mony, visited Johannesburg last summer, a number of the ZS6 YLs turned out to honor her at a luncheon. L. to r.: ZS6MN, Maggie; OQ5FH, Mony; ZS6AP, Eunice; ZS6KK, Marie; ZS6GH, Diana; ZS6AEU, Anitra; ZS6ACT, Cynthia, and ZS6AJR, Jean. Photo via ZS6OH.

shacks. The registration fee is $2 and should be sent to W8ATB at 4098 E. Atherton Rd., Flint 7, Mich. by May 10th, if possible. Motel registrations should be made two weeks in advance.

With the Clubs

Via K6ENK and K6BUS comes news of a newly formed YL club in northern California. Invitations had been sent to all YLs in the area and on Jan. 25th nine YLs met to form the club. Sacramento, meeting place for the group, is known as the Camellia City, and this name was incorporated into the club name—Camellia Capitol Chirps—to be known as the "3C's." Officers elected were: President, K6ENK, Wanda; vice president, W6HTS, Mildred; secretary, K6UZA, Doris; treasurer, K6ENH, Aleta; publicity, K6HOI, Pat.

The Los Angeles YLRC held its annual YL-OM Valentine Banquet on Feb. 9th at the Hillcrest Rancho Restaurant in Pasadena with over 100 attending. Chairman for the most successful affair was W6DXI, Gladys, being assisted by W6CEE, Vada; W6KER, Gilda; W6TDL, Clara, and W6JZA, Elsa. Tables were decorated with red tulle hearts banked with camellias from Elsa's own garden. Guest speaker was Danny Weil of "Yasme" fame.

From W6PCN, Peggy, we hear that during recent months the YLRC/San Francisco has acquired a foreign YL "adoptee," reworked it's club constitution, elected new officers, held their third anniversary dinner, and acquired a regular meeting place. Their adoptee is G8LY, Constance Hall of England, who is active on 20 meters. New officers for the club are: President, K6HIW, Kay; vice president, K6CUV, Lee; secretary, W6QMO, Jeri; treasurer, K6EEE, Vi; Executive Committee: W6BDE, Esther; W6PCN, Peggy; Myrtle Browne and Rose Buckley. The 3rd anniversary dinner was held Jan. 19th with 31 attending, with W6BYB, well-known local DXer, as guest speaker. K6HIW, Kay, has made her "rumpus room" available for a regular club meeting place. The

(Continued on page 112)

the 1957 CQ World Wide DX Contest

Frank Anzalone, W1WY
14 Sherwood Road
Stamford, Conn.

Quite a party we had the last two weekends of October. The 1400-odd logs from over 100 countries proved it wasn't a local affair. Everybody got into the act.

I had predicted a 50 per cent increase over last year's returns, and altho the boys did not quite make that figure it was not because of lack of activity. Some of the fellows just did not bother to send in a report.

Most of my contest time was spent listening, so I have a pretty good idea of what was going on. The familiar calls, always heard in these annual "brawls," were in there alright but many of their logs never showed up. CQ goes to a lot of trouble and expense to make these annual contests as interesting as possible. Your report is the only way there is of knowing if it has been successful.

As a whole the logs this year were in much better shape than last year. However there is still much to be desired. Many failed to follow the prescribed rules of using a separate page for each band, keeping the time in GMT and recording the Zones and Countries only the first time they are worked. Many failed to tabulate their score. The Committee again bent over backwards and did this work for them. Don't press your luck too far fellows, next year you might end up in the Check Log column.

Every station that sent us a report will see it published in the next two issues of CQ. If you do not see your call listed, it's because we did not receive your log, or maybe you tried to pull the wool over our eyes. You might fool the Committee some of the time but sooner or later we are going to catch up with you. Savvy?

The commentary on the report page of the received logs is always very informative and serves as a guide for future planning. Might I also add that sometimes it proves quite amusing. To quote a few:

KH6PM—"Conditions were very poor as compared to a few weeks prior to contest time."—That seemed to be the complaint of almost everybody, Fred. Without being repetitious, we can't help but again mention the lousy conditions that plagued us, especially during the CW portion. There is no doubt that these erratic conditions held down the number of participating stations as well as the scores. Altho when you see some of the scores you will wonder how they were ever accomplished.

VS6AE—"Congratulations on excellent arrangements of this contest, everybody seemed well informed."—Well, Pat, they should have been. We had the dates and the rules in the mail at least three months before contest time. They were sent to all the QSL Bureaus and major radio clubs in the world. For the first time logs have been received from the boys in the USSR.

VQ4RF—"A very enjoyable contest. Was pleased to finally make over 100,000 points on a single band."—You certainly did make it, Roy, with plenty to spare, on 28 mc fone. Your 94,000 points was tops for last year, but it's not in the same class with your score this year. As a matter of fact quite a few of the boys surpassed the 100,000 mark on a single band. The "antenna farm" operators really went to town, especially on CW, where the Top Ten will all be in the half a million class. Wonder if anyone will ever break a million? ("Perish the thought," says Ben W2JB, "I don't want to check that log.")

CR6DA—"This is the first time I have gone into a competition. Please send instructions and printed forms for next contest."—We certainly will, Bernardo, glad to have you with us this year.

We started to count the number of "first timers" but gave up when the figure ran up over a hundred. Glad to have you aboard, fellows. Now that you have been bitten by the DX contest bug we are sure you will be sending in logs for many years to come. Especially KØBSL and W5JRE, who both are only 15 yrs. old.

CE3AG—"I do not like the inclusion of the 1.8 and 27 mc. bands." A few others were of the same opinion, Luis, but they are very much in the minority.

W4KFC—"Still the best of DX contests. Let's leave the rules intact."

CX2CO—"This is by far the most interesting and enjoyable contest of the year."

W3EIV—"Best ever, keep this contest going, it's a good one."

VQ4ERR—"Good show, thanks. Send log sheets for 1957."

Thanks a lot, fellows. Personally we feel the rules as they now stand give everybody a fair break. The addition of the 27 mc band,

Front to rear — W6BXL, and W6YMD. W6KFU was the only one awake to take the picture.

we realize, gives the western hemisphere an advantage, but this somewhat equalizes the geographic advantage of the eastern hemisphere, especially the mideast Therefore few or no changes are contemplated in the rules.

ZL1MQ—"Nobody in ZL happy about the rule of only one award per station. Looks like the purpose is to save space and not publish the full results."—Sorry we cannot see eye to eye with you on this one, Cliff. On this particular point the comments have been overwhelming in favor, as indicated by—

VE3DT—"The single band feature means a lot to operators like myself with limited antenna facilities."

(Continued on page 113)

Contest Calendar

April	6– 7	DARC – WAEDC – CW (Last Half)
April	13–14	REF – DX – Phone
April	27–28	Dutch–PACC – CW
May	4– 5	Dutch–PACC – Phone
May	18–19	Helvetia 22

Helvetia 22

We do not have any details on this one but the idea is to work as many Cantons as possible. The HB stations will follow their call with a prefix denoting the Canton in which they are located. The hard to get Cantons are usually active during this contest so this is your opportunity to catch up on your confirmations for that colorful Helvetia certificate.

Dutch PACC Contest

All amateurs are invited to participate.

Times: CW period. 1200 GMT, April 27th to 2400 GMT, April 28th. Phone period. 1200 GMT, May 4th to 2400 GMT, May 5th.

Proceedure: Numerical exchanges same as WAE contest: 579001 etc. PA stations will indicate their province location by two letters following their call as follows:

FR–Friesland; NB–Noord-Brabant; NH–Noord-Holland; UT–Utrecht; OV–Overijsel; GR–Groningen; LB–Limburg; ZL–Zeeland; ZH–Zuid-Holland; GD–Gelderland; DC–Drente

Score: 3 points per exchange. Multiplier is sum of Dutch Provinces worked on all bands.

This contest may help you to obtain the PACC Certificate which is given for submitting proof of contact with 100 PA stations. Logs must be mailed before June 15th to P. v. d. Berg, PAØVB, Contest Manager of VERON, Keizerstraat 54, Gouda, Netherlands.

Contest Certificates go to highest scorer in each country. Phone and CW.

73, Frank, W1WY

Fig 2: This giant dish, 25 feet in diameter, is a radio telescope used by the Central Radio Propagation Laboratory of the National Bureau of Standards. Located near Boulder, Colorado, it detects radio energy emitted by the sun. The steerable paraboloid radio telescope planned for the National Radio Observatory, capable of probing much deeper into the solar system, stars and distant galaxies, will be 140-feet in diameter. National Bureau Of Standards Photo.

PROPAGATION

Based upon the 27 occurrence tendency, April is expected to be a relatively disturbed month. S.W. radio conditions varying between unsettled and scarcely disturbed are most likely to occur during April 1-2, 8-9, 13-19 and 28-30. Auroral displays are expected to accompany periods of severe radio disturbance. Exceptionally good S.W. prop conditions are forecast for April 25-27 with remainder of the month seasonably normal.

George Jacobs, W3ASK
607 Beacon Road
Silver Spring, Md.

Sunspot Cycle

The Swiss Federal Solar Observatory at Zurich reports a monthly mean sunspot number of 153 for January, 1957. This results in a 12-month running *smoothed* sunspot number of 145 cen-

ALL TIMES IN EST

EASTERN USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	7A-9A (2) 9A-12N (3) 12N-3P (4) 3P-6P (2)	5A-8A (3) 8A-12N (2) 12N-3P (3) 3P-5P (5) 5P-7P (3) 7P-10P (2)	3P-5P (2) 5P-9P (5) 9P-11P (4) 11P-4A (3) 4A-8A (1)	6P-11P (3) 11P-1A (2) 10P-12M (2)*
Central Europe	7A-10A (2) 10A-3P (3) 3P-5P (2)	5A-7A (2) 7A-11A (1) 11A-1P (2) 1P-5P (3) 5P-9P (2)	2P-5P (2) 6P-9P (4) 9P-12M (3) 12M-3A (1)	7P-12M (2) 8P-11P (1)*
Eastern Mediterranean	7A-9A (1) 9A-3P (2) 3P-6P (1)	6A-11A (1) 11A-1P (2) 1P-6P (3) 6P-9P (2) 9P-11P (1)	1P-3P (1) 3P-5P (2) 5P-11P (4) 11P-3A (1)	7P-11P (2) 8P-11P (1)*
North and Central Africa	7A-9A (2) 9A-11A (3) 11A-2P (4) 2P-5P (2)	4A-6A (2) 6A-12N (1) 12N-3P (3) 3P-5P (4) 5P-9P (2)	1P-3P (1) 3P-5P (2) 5P-9P (5) 9P-1A (4) 1A-5A (2)	7P-1A (2) 8P-11P (1)*
South Africa	7A-11A (1) 11A-3P (4) 3P-6P (3) 6P-8P (1)	10A-1P (1) 1P-3P (2) 3P-7P (4) 7P-1A (2) 1A-5A (1)	1P-4P (1) 4P-6P (2) 6P-10P (4) 10P-1A (3) 1A-3A (1)	8P-11P (1)
South America	12N-6P (1)** 5A-10A (4) 10A-3P (3) 3P-6P (5) 6P-10P (3) 10P-1A (2)	1A-9A (3) 9A-2P (1) 2P-5P (2) 5P-9P (5) 9P-1A (4)	3P-5P (2) 5P-7P (4) 7P-1A (5) 1A-5A (3) 5A-7A (2)	7P-12M (2) 12M-4A (3) 4A-7A (2) 12M-4A (1)*
South East Asia	9A-12A (1) 4P-7P (2)	8A-10A (2) 10A-4P (1) 4P-9P (2) 9P-11P (1)	5P-7P (1) 7P-12M (2) 12M-8A (1)	NIL
Australasia	10A-12N (2) 12N-4P (1) 4P-9P (3) 9P-11P (1)	7A-9A (2) 9A-4P (1) 4P-9P (2) 9P-12M (3) 12M-7A (1)	10P-12M (2) 12M-4A (4) 4A-8A (3) 8A-10A (2) 10A-10P (1)	2A-8A (2) 4A-6A (1)*
Guam and Pacific	3P-5P (2) 5P-7P (3) 7P-9P (1)	7A-12N (2) 12N-3P (1) 3P-6P (2) 6P-10P (3) 10P-12M (1)	7P-9P (1) 9P-1A (2) 1A-4A (1)	10P-4A (1)
Japan and Far East	4P-6P (2) 6P-8P (1)	7A-10A (2) 2P-5P (2) 5P-9P (3) 9P-12M (2)	5P-10P (1) 10P-3A (2) 3A-6A (1) 6A-8A (2)	NIL

ALL TIMES IN CST

CENTRAL USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe	7A-10A (2) 10A-2P (4) 2P-4P (2)	4A-11A (3) 11A-3P (4) 3P-5P (3) 5P-8P (2)	11A-2P (2) 2P-8P (4) 8P-1A (3) 1A-3A (2) 3A-7A (1)	7P-12M (2) 8P-11P (1)*
Southern Europe & North Africa	6A-9A (2) 9A-1P (4) 1P-3P (2)	4A-11A (2) 11A-1P (3) 1P-4P (4) 4P-6P (3) 6P-8P (2)	1P-3P (1) 3P-6P (3) 6P-10P (4) 10P-12M (3) 12M-4A (2)	7P-12M (2) 8P-11P (1)*
Central & South Africa	5A-9A (2) 9A-12N (3) 12N-3P (4) 3P-6P (3) 6P-8P (1)	10A-1P (2) 1P-7P (4) 7P-12M (3) 12M-4A (1)	12N-3P (1) 3P-5P (2) 5P-9P (4) 9P-11P (3) 11P-2A (1)	8P-10P (1)
South America	11A-6P (1)** 5A-10A (4) 10A-2P (3) 2P-6P (5) 6P-12M (3)	4P-6P (3) 6P-11P (5) 11P-2A (3) 2A-5A (2) 5A-9A (3) 9A-4P (2)	2P-5P (2) 5P-7P (4) 7P-1A (5) 1A-5A (3) 5A-8A (2)	7P-12M (2) 12M-4A (3) 4A-7A (2) 12M-4A (1)*
Hawaii	9A-11A (2) 11A-4P (3) 4P-8P (4) 8P-11P (2)	9A-4P (3) 4P-10P (5) 10P-3A (3) 3A-9A (2)	4P-6P (3) 6P-3A (5) 3A-7A (4) 7A-9A (3) 9A-4P (2)	9P-7A (4) 11P-5A (3)*
Japan & Far East	1P-3P (2) 3P-7P (3) 7P-9P (2)	7A-9A (2) 9A-1P (1) 1P-3P (2) 3P-9P (3) 9P-12M (2)	6A-8A (3) 8A-2P (1) 2P-8P (2) 8P-1A (3) 1A-6A (1)	12M-6A (1)
South East Asia	9A-2P (1) 2P-7P (2)	7A-9A (2) 9A-2P (1) 2P-9P (2) 9P-11P (1)	7A-9A (2) 4P-7P (1) 7P-11P (2)	NIL
Australasia	8A-11A (2) 11A-2P (1) 2P-8P (3) 8P-11P (2)	7A-9A (3) 9A-3P (1) 3P-8P (2) 8P-12M (3) 12M-7A (2)	5P-8P (2) 8P-11P (3) 11P-8A (4) 8A-10A (2) 10A-5P (1)	1A-8A (2) 3A-6A (1)*
Antarctica	11A-2P (1) 2P-6P (2) 6P-9P (1)	8A-2P (1) 2P-7P (2) 7P-10P (3) 10P-2A (2)	8A-4P (1) 4P-7P (2) 7P-2A (3) 2A-8A (2)	11P-6A (2) 12M-5A (1)*

tered on July, 1956. The present sunspot cycle has already soared beyond the peak intensity recorded during 16 of the 18 previous sunspot cycles observed since 1749. As of July, the peak of the present cycle had not yet been reached! This month's forecast is based upon a predicted smoothed sunspot number of 171 centered on April, 1957.

Propagation Conditions—April

During April and early May, atmospheric noise levels in the United States increase upwards by 5 db or so, on the average, from winter values. This results in a considerable increase in static levels on the 10, 15 and 20-meter bands during the daylight hours and on the 40, 80 and 160-meter bands during the hours of darkness.

The occurrence of sporadic-E layers in the ionosphere begins to increase during April, rising to a peak during the late spring and summer months. Sporadic-E propagation results in numerous short-skip openings on the 15, 10 and 6-meter bands.

From the 19th through the 23rd of the month the Lyrids meteor shower will occur, with a good probability of meteor type band openings on 6 and 10-meters. Another meteor shower, Aquarids, will occur between May 1st and 6th.

Auroral activity has a tendency to peak in occurrence during April, resulting in disturbed conditions on the high-frequency bands but causing unusual ionospheric openings in the VHF range of the spectrum.

The following is an overall picture of band conditions forecast for April, 1957, with a brief discussion of the qualitative changes in each amateur band from month to month. For specific times of band openings for a particular DX circuit, refer to the *CQ Propagation Charts* on the opposite page.

6 Meters: Because of the seasonal decrease in daytime values of MUF's, F-2 layer propagation to most parts of the world will not be possible until the fall. However, some 6-meter openings are likely to occur to South America between noon and the early evening hours, and the MUF between the West Coast and Australasia hovers near the 50 megacycle mark between 2P and 6P PST. As a result of aurora, sporadic-E, meteors and scatter, numerous short-skip 6-meter openings can be expected for distances up to approximately 1400 miles.

10 Meters: Very good world-wide propagation conditions are expected to continue on this band through April and early

ALL TIMES IN PST

WESTERN USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Europe and North Africa	8A-10A (2) 10A-1P (3) 1P-3P (2)	6A-9A (1) 9A-11A (2) 11A-2P (4) 2P-8P (2)	11A-2P (1) 2P-7P (3) 7P-12M (2) 12M-8A (1)	6P-10P (1)
Central and South Africa	7A-10A (2) 10A-2P (3) 2P-6P (4) 6P-8P (2)	8A-11A (1) 11A-2P (2) 2P-4P (3) 4P-8P (4) 8P-1A (2)	1P-3P (1) 3P-5P (2) 5P-9P (4) 9P-12M (2) 12M-8A (1)	6P-10P (2) 7P-9P (1)*
South America	11A-6P (1)** 6A-12N (3) 12N-2P (5) 2P-6P (4) 6P-9P (3) 9P-12M (1)	1P-3P (3) 3P-7P (5) 7P-10P (4) 10P-2A (3) 2A-1P (2)	3P-6P (2) 6P-8P (3) 8P-11P (5) 11P-4A (3) 4A-8A (2)	8P-10P (2) 10P-12M (3) 12M-3A (2) 10P-12M (1)*
Guam and Pacific Islands	7A-10A (2) 10A-2P (3) 2P-6P (2) 6P-10P (3)	7A-12N (3) 12N-7P (1) 7P-12M (3) 12M-7A (2)	8P-10P (1) 10P-2A (2) 2A-8A (3) 8A-11A (2)	1A-6A (2) 4A-6A (1)*
Australasia	2P-6P (1)** 7A-3P (2) 3P-6P (3) 6P-10P (4) 10P-2A (2)	5A-12N (2) 12N-6P (1) 6P-1A (4) 1A-5A (2)	7P-9P (2) 9P-2A (3) 2A-5A (4) 5A-8A (3) 8A-10A (2)	11P-2A (1) 2A-6A (2) 6A-8A (1) 2A-6A (1)*
Japan, Okinawa & Far East	10A-12N (2) 12N-7P (4) 7P-10P (2)	8A-12N (3) 12N-8P (2) 8P-12M (3) 12M+4A (2) 4A-8A (1)	8P-1A (2) 1A-7A (4) 7A-10A (3) 10A-1P (2)	1A-3A (1) 3A-7A (2) 3A-7A (1)*
Philippine Islands and East Indies	8A-11A (3) 11A-2P (2) 2P-4P (3) 4P-11P (2)	7A-12N (3) 12N-3P (2) 10P-7A (2)	1A-6A (1) 6A-12N (2)	4A-7A (1)
Malaya & South East Asia	8A-11A (3) 11A-2P (2) 2P-6P (3) 6P-10P (1)	7A-12N (3) 12N-3P (2) 10P-3A (2)	12M-6A (1) 6A-10A (2) 10A-1P (1)	4A-7A (1)
Hong Kong, Macao and Formosa	8A-12N (1) 12N-8P (3) 8P-10P (1)	7A-12N (3) 12N-8P (2) 8P-12M (3) 12M-3A (2) 3A-7A (1)	10P-2A (2) 2A-7A (3) 7A-11A (2)	2A-4A (1) 4A-7A (2) 2A-5A (1)*

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) Over 26 Days

** Indicates possible six-meter openings
* Indicates possible eighty-meter openings

Time Symbols: A - A.M. N - Noon P - P.M. M - Midnight

The CQ Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through May 15, 1957. These forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colo.

May. Openings to all areas of the world should be possible, with the band peaking during the afternoon hours. Short-skip openings between 1300 and 2400 miles should occur daily from late morning until early evening. Openings for shorter distances will be considerably less numerous than during the winter months. Propagation conditions on the 11-meter band are expected to be similar to those forecast for 10-meters.

15 Meters:

The band will be optimum during the late afternoon and early evening hours, with reception possible from all areas of the world. Circuits to South America and Australasia may remain open around the clock during periods of exceptionally good propagation conditions. Short-skip openings between approximately 750 and 2400 miles are expected to occur daily between the late morning and evening hours.

20 Meters:

Twenty-meters is expected to be the best band propagation-wise during the evening hours. From late afternoon until after dawn good conditions are expected to most areas of the world. During the daylight hours, high solar absorption will limit most openings to short-skip distances between approximately 250 and 1300 miles.

40 Meters:

Higher noise levels and fewer hours of darkness mean generally poorer propagation conditions on 40-meters. During the daylight hours, extremely high solar absorption will limit openings to short-skip distances between approximately 100 and 750 miles. As the hours of darkness approach, solar absorption decreases, and skip increases. Between sundown and dawn, DX propagation should be possible to many areas of the world.

80 Meters:

Eighty-meter DX openings will be generally spotty, with weak signals and high noise levels. On a small percentage of nights during the month the band may open to some areas of the world. For the most part, 80-meter propagation will be limited to short-skip distances up to about 2400 miles during the hours of darkness and less than 200 miles during the hours of full daylight.

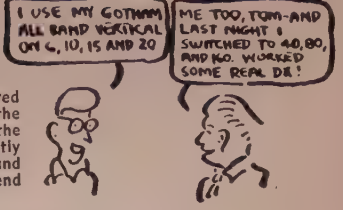
160 Meters:

Preliminary reports from W1BB indicate that while 160-meter openings occurred to many areas of the world during the past few months, they were not as numerous as those observed during years of lower solar activity. With increased noise levels, greater absorption and longer hours of daylight expected during April, it is very unlikely that night time skip distances will greatly exceed 1300 miles. During periods of exceptionally low static levels, propagation to greater distances may be possible, especially during the pre-dawn hours. During the daylight hours propagation on this band is limited to approximately the line of sight ground wave range.

Trans-Equatorial Propagation

Primarily as a result of CQ's joint sponsorship with the Air Force resulting in 6-meter research by radio amateurs during the peak of the last sunspot cycle, an unusual propagation phenomenon was detected. Between the years 1947 and 1950, hundreds of 6-meter contacts were made between

ALL-BAND VERTICAL ANTENNAS

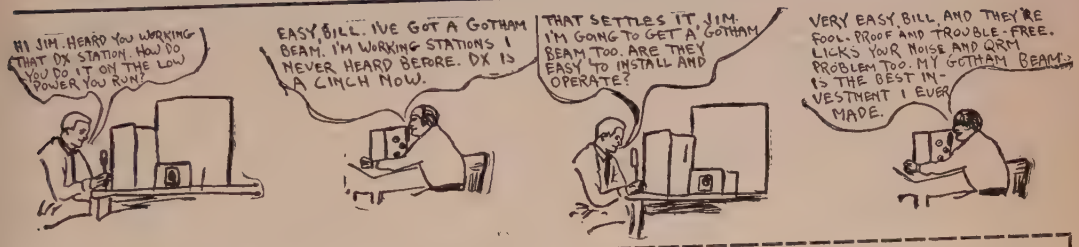


GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna is absolutely complete, can be assembled in less than two minutes, and requires no special tools or electronic equipment. Radiation is omni-directional, with maximum radiation at very low, DX angles. Perfect multi-band operation is secured through simple, efficient design and superior materials. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate perfectly on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V40 multi-band verticals. No guy wires needed, rugged, occupies little space, proven and tested. Send for your vertical multi-band antenna today!

V160 (for 160, 80, 75, 40, 20, 15, 10 and 6 meters)..... $18.95
V80 (for 80, 75, 40, 20, 15, 10 and 6 meters)..... 16.95
V40 (for 40, 20, 15, 10 and 6 meters)..... 14.95

Complete instructions included with each antenna—literature on request

WORK THE WORLD WITH A GOTHAM BEAM



Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

MORE DX CONTACTS WITH GOTHAM

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

THE DESIGN IS PROVEN

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams; 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

THOUSANDS IN DAILY USE

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

ALCOA QUALITY ALUMINUM

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

CONSISTENT PERFORMANCE

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between ¾" and 1⅝".

NO FLIMSY WOOD OR INSULATORS

STANDING WAVE RATIO. A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

QUICK INSURED DELIVERY

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use ⅝" and ¾" tubing elements; the deluxe models for these bands use ⅞" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

THE PRICE IS RIGHT!

HOW TO ORDER: Send coupon with check or money order directly to GOTHAM or order from your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

AIRMAIL ORDER TODAY—WE SHIP TOMORROW

GOTHAM

DEPT. CQ

1805 Purdy Ave., Miami Beach, FLA.

Enclosed find check or money-order for:

2 METER BEAMS			
☐ Deluxe 6-Element	$9.95	☐ 12-El	$16.95
6 METER BEAMS			
☐ Std. 3-El Gamma match	12.95	☐ T match	14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match	24.95
☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95
10 METER BEAMS			
☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match	28.95
☐ Std. 4-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95
15 METER BEAMS			
☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95
20 METER BEAMS			
☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34.95	☐ T match	37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

☐ Beam #R6 (6 Meters, 4-El)..... $38.95
☐ Beam #R10 (10 Meters, 4-El).... 40.95
☐ Beam #R15 (15 Meters, 3-El)..... 49.95

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the United States and many countries of South America during the late afternoon and evening hours, times when the regular F-2 layer maximum usable frequency was thought to be considerably *below* 50 megacycles! These openings appeared to peak in occurrence during the spring and fall months and had a tendency to follow ionospheric disturbances and auroral outbursts. With the passing of peak solar activity these 6-meter openings ceased to occur although they had been reported from time to time on 10-meters during the years of low sunspot count. While the mode of propagation responsible for openings of this type has not yet been completely explained, the flutter and hollowness associated with these signals suggest some sort of scatter mechanism. It is possible that scattering is taking place from areas of intense F-2 ionization known to be prevalent in Equatorial regions during the evening hours. During the Internatonal Geophysical Year, July 1, 1957 through December 31, 1958, this type propagation will be studied by scientists throughout the world in an effort to find an explanation for it. Based on the results of the past sunspot cycle, and the fact that it was observed again this past fall, we can expect an increase in its occurrence during this coming month.

Fig 1 is a graph of the median value of maximum usable frequencies forecast for April on a circuit between Havana, Cuba and Lima, Peru. The mid-point of this circuit, where the signals are reflected from the ionosphere, occurs near the Equator in the region of intense F-2 ionization. As a result, frequencies as high as 50 megacycles can be reflected throughout most of the day. As the northern terminal extends further into northern latitudes, the number of days that 6-meter openings occur decreases rapidly, never-the-less numerous openings are expected during April.

Radio Astronomy

The National Science Foundation has announced plans for establishing a National Radio Observatory near Green Bank, West Virginia. The Observatory will have a 140-foot steerable parabolic radio telescope, one of the world's largest and finest. While of tremendous importance to astronomers, the creation of a National Radio Observatory is of considerable interest to those in the fields of radio and electronics as well.

Utilizing the latest advancements in electronic research in the Super High Frequency (SHF) range, the radio telescope will be able to scan the entire northern sky, far beyond the present limits of optical telescopes. The exceptionally high gain 140-foot steerable parabolic antenna will probe the heavens with an extremely narrow, pencil like beam, detecting faint radio energy originating from the solar system, stars and the distant galaxies. These radiations lie in the radio spectrum between approximately 7 and 21 *centimeters* wavelength, or roughly 15,000 to 45,000 *megacycles*. The "big dish" will be backed by the latest in electronic equipment and circuitry for receiving, amplifying and recording these signals.

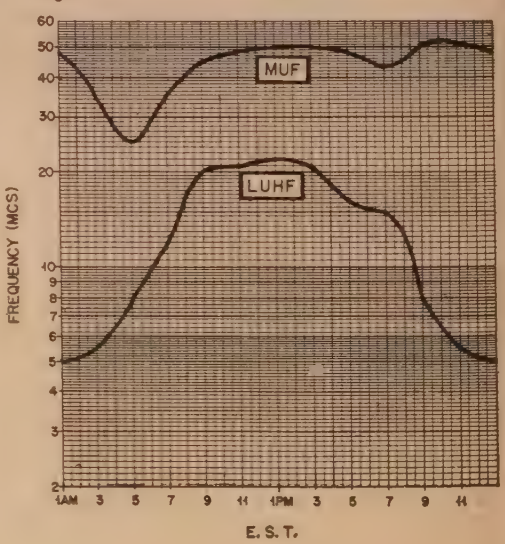
The source of this radio energy, originating millions and millions of miles away, is not yet precisely known. Present day theories suggest that the enormous temperatures in the region of the sun, and the chemical-molecular composition of the universe itself, may be responsible for it.

Scientists are planning many research projects and studies for the giant radio telescope. Of interest to readers of this column is the fact that special attention will be paid to further investigation of the unusual electro-magnetic radiations emitted from the sun during periods of solar outbursts or flares. These solar eruptions are responsible for sudden radio blackouts in the high frequency spectrum disrupting communications for several hours upwards to several days. With increased knowledge concerning the behaviour of the sun's radio energy, these signals may someday be utilized as a means for accurately forecasting the occurrence of radio blackouts well in advance and for predicting radio propagation conditions in general. By tracking signals from outer space through the earth's atmosphere, the radio telescope may contribute enormously to a more complete understanding of the influence of the ionosphere and the earth's atmosphere upon radio wave propagation. It has also been suggested that the proposed 140-foot steerable radio telescope might make an ideal receiver for moon-bounce experiments, and similar attempts for reflecting radio signals off of other planets!

Next month, a discussion of sporadic-E propagation and short-skip openings. In the works for subsequent discussion in this column are articles on "long-way around" propagaton, atmospheric noise, equatorial absorption, scatter propagation and a visit to the Central Radio Propagation Laboratory of the National Bureau of Standards at Boulder, Colorado.

73, George, W3ASK

Fig 1.



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Features greatest sensitivity at any price! Greater stability than most receivers. 18 dial scales cover 160 to 11¼M with exclusive converter provision with scales calibrated for 6, 2 and 1¼M, using a special 30-35 mc. tunable IF selector — .5 Kc., 3.5 Kc. and 8 Kc. Provides super selectivity, gives optimum band width for CW, phone, phone net or VHF operation. Separate linear detector for SSB. High speed inertia tuning dial with 40 to 1 ratio. Exclusive optional RF gain provision for best CW results allows independent control of IF gain. Giant "S" meter. Dual conversion. Calibration reset adjustable from front panel. Crystal filter with phasing control and 3-position band width control. First IF freq. — 2215 Kc., second: — 80 Kc. 19 tubes plus regulators and rectifiers. Antenna input impedance: 50-300 ohms. Output impedances: 8 ohms. Less speaker.

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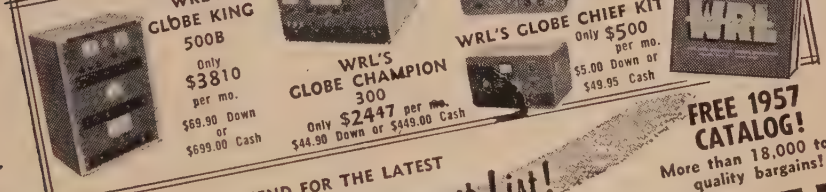

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For further information, check number 48 on page 130.

wiring layout below the chassis. Almost all the wires follow the same route, making it quite simple to tie the cable up with lacing cord. This makes a very neat looking unit and adds the "commercial appearance." That large knob on the left side of the cabinet does not allow you to crank up the plate voltage to 500 watts. It is fastened to a hole plug that allows access to the crystal, when removed. This is supposed to minimize television interference, however, I could find none when the DX-20 was used with a low pass filter with or without the crystal covered.

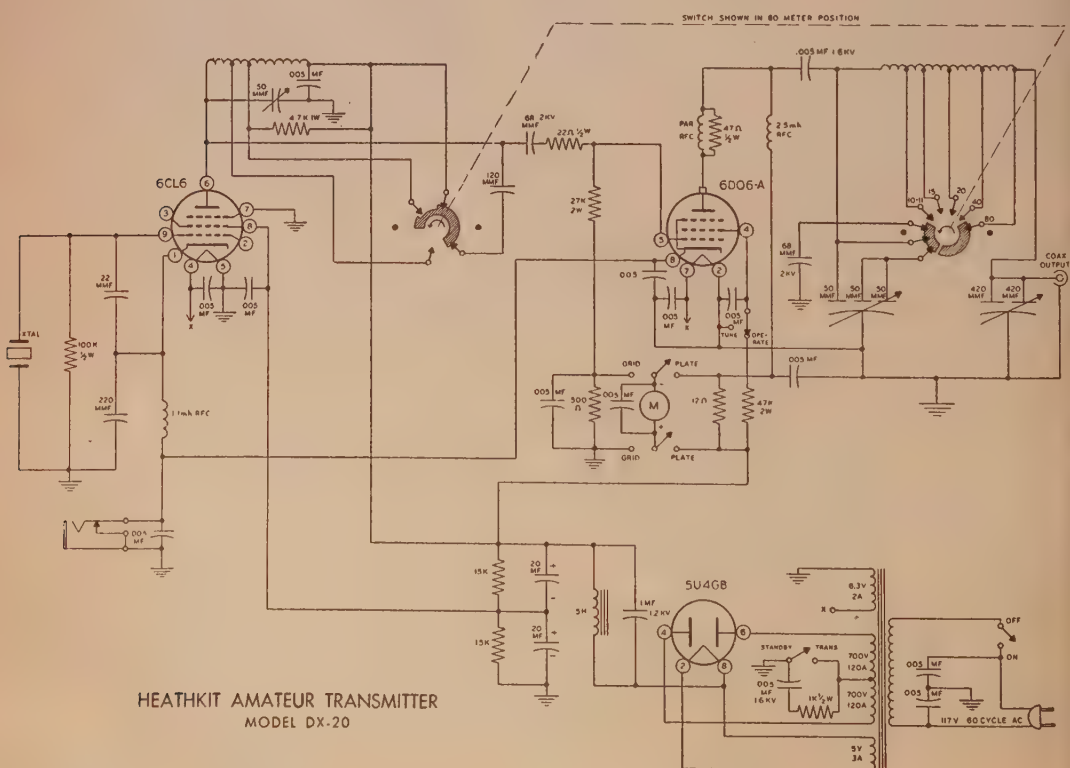
How do I tune a transmitter such as the Heath DX-20? First, place the slide switches in the on, standby, and tune position. Set the oscillator, amplifier and loading knobs to zero. Insert a Novice band crystal into the crystal holder and place the bandswitch in the right (correct) position. Place the meter switch in the grid position, switch to transmit, depress the key, and tune the oscillator knob for two milliamps indication on the meter. Next, switch the meter to the plate position and tune the amplifier knob for a dip in the plate current. Now, place the switch on the right side to operate. Key the transmitter and gradually turn the loading control to the right (towards minimum capacity). A good sequence would be, first to 10 on the loading dial, then dip the amplifier control to read minimum. Then, increase the loading to 20. Again dip the final and so on until *minimum* plate current in the dip is 100 milliamperes.

I was interested to find that I had worked a station with the transmitter in the tune position. The station was in Ohio and he gave me an RST 457. A check of the power output with the switch in this position showed about 2.1 watts! Just think what the report would have been with "full power!"

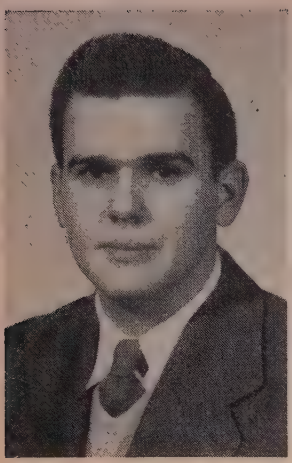
Getting Out and Getting In

KN2UEC sent me a letter that related a sad and common story. "My Novice ticket is six months old and I have yet to get on the air. Essentially, I believe my problem is an antenna. You see, I live in a housing project known as Stuyvesant Town on the lower east side of N.Y.C. I live smack in the middle of a 14-story bldg. which has plenty of steel in it and the bldg. is surrounded by similar steel bldgs." Tom enclosed some skeches of several schemes that he had tried, but to no avail. I believe that, *generally* the more wire you can get outside the hamshack, the more signal you will radiate. I suggested that Tom hang a long wire out the window with a sinker attached to the end. The wire (which should be extremely fine) could be routed to the right or left side of the windows below so that it would be un-noticed. In case of a wind storm, it could be hauled in before it broke any windows. Such an antenna could be fed several ways. One, you could reel out wire until the antenna "took a load" or you could use a random length and load it with an *L network* antenna coupler such as the Heath AC-1.

Another ham wrote to say that he was getting



HEATHKIT AMATEUR TRANSMITTER
MODEL DX-20



Who worked all continents during a 24 hour period, one week after receiving his General ticket? Why, Vernon Dameron, K8BUL, of course, and he did it all on one band and on phone.

into one of those 5 tube ac/dc radios (and I use the term loosely). I have had BCI (broadcast intereference) many times and I had a solution already available. In such a case, I locate the first audio tube in the radio. This is usually a triode/diode such as a 12AV6, 12AT6, or 12SQ7. Next, with the aid of a tube manual, locate the grid and the cathode pins and simply solder a 470 mmf disc ceramic with *short leads* across these pins. This will fix the trouble about 99% of the time.

Letters to the Novice Editor

Dave Biegen, 69-35 226 St., Bayside 64, New York writes: The handle here is Dave, recently KN2VJS. I am really thrilled to join the Amateur Radio ranks. To be perfectly frank, I didn't know Amateur Radio existed until one dull school library period, I found a magazine, you guessed it, CQ! (HI). From the end of that magazine, I had the bug. I am running an SX-71 and an ARC-5 transmitter. Future rig will be a DX-100 and a 20 meter beam. If KN4LEA is reading this (*Doesn't everyone?*), pse QSL, I could not find your QTH. C U Sn 73's Dave *Fine business Dave, and I hope that you get that QSL card.*

Behind that broad smile, sets Paul Taylor, KN1AFI. It is a good thing that the photo was clear, for Paul forgot to include his call in his letter to me.

Eric Bregman, WN3HWY, 6709 Wissahickon Ave., Phil. 19, Pa. sends along oriental greetings: Hon ed: I am a died in the woul fan of Scratchi's and ken sai thet this column and the wa most of ur articels show a remarkibel cense of humor. It is 1 of the big resons I am so much in luv withe CQ. And tho I hav only bin reeding them for abt a yr (on acct I am onli 12 yrs old and just got license in July '56) I think they are the best magicins that ive cine in my fref butthoroly enjoying assoc with them. Pse kep up the gd wk Eric. *I think you are gust kidding Eric, I don't think U hav bin influinsed by Scratchi et al.*

Back to a more serious vein, Ron Reed, W6ODX, 11671A San Vicente Blvd., LA 49, Calif. sends in some excellent information. Southern California Novices, take note: Thanks to the FCC's recent amendment, permitting keying of code onto a steady carrier for instruction purposes only, provided that the Code Practice transmission is followed immediately by adequate instruction by voice, this station, W6OD, has shifted its Monday, Wednesday, Friday and Saturday evening Code Practice transmissions from 3552 kc to 3836 kc, heard as usual commencing at 8 PM and continuing through 8:30 PM, Pacific Time. Best regards, Ron. *Ron has a class at Santa Monica City College, in Santa Monica on Tuesday and Thursday evenings from 6:30 to 9:30. Code transmissions at the school and on the air are followed by a microphone read back permitting the students to check the accuracy of their copy. Transmissions are broken down into two 5 minute groups from 13 to 15 WPM and 20 to 25 WPM. Thank you very much, Ron, for this information.*

Vernon Dameron, Jr., K8BLU 22155 Beech Street, Dearborn 8, Michigan passes along some encouraging information. I have just done something which I do not think is done too often. I have had my general license only 1 week, and have done very little DXing with it until Thursday, January 31. Then between this date and February 1, in less than 24 hours, I worked all continents, on one band and on phone! The following is the list of what I worked: ASIA KA2MR, AFRICA ZS6XB, EUROPE G3CVG and DL9RE, OCEANA KH6CEX, S. AMERICA LU6MR, N. AMERICA KL7GL. Vernon Dameron Jr. *Fine business Vernon, I wish I could say I had worked all continents (WAC) but I still need Africa—Hi. See what happens when you get your General ticket fellows, get hot!*

From Donald L. Lecklitner, KN9DFK RR3, Frankfort, Indiana I received a gripe letter about stations tuning up in the Novice bands. However since we all have the same trouble, it is an old story. However, he adds: I have worked 34 states and 2 VE's with a DX-35 and an NC-88 rig. I work all bands, but get as good results on 80 meters as I do on 15 meters. I have worked California, Washington and British Columbia on 80! Will sked anyone needing Indiana as I would like to get some 7's myself. Good luck on your column, Don. *I sympathize with you Don, and thanks for the best wishes, I'll need 'em!*

More helping hands in the person of Fred Sultan, KN4KZD, 2024 Hollywood Blvd., Hollywood, Florida. He says: I would like to pass along some helpful advice for anyone in the Broward County Area who is interested in getting started in Ham Radio. On Sunday afternoons, Tuesday evening, and Wednesday evening a small group of fellows meet at the Broward County Civil Defense Radio Shack at 209 N. W. 1st Ave., Ft. Lauderdale, Florida to practice code and theory. We have started about 12 fellows so far on the road for their tickets and we welcome all who are sincerely interested in ham radio. I am on the air only three weeks with a DX-100 and an SX-100 to a 15 meter beam and an all band dipole. I have worked 15 states so far. 73's Fred Sultan. *Fine business Fred. This is a wonderful and gratifying job that you are doing. If there are any other groups such as this, I would like to know about them.*

Clyde Mason, KNØGJE, 855 S. West Ave., Springfield, Mo., is looking for a Vermont contact. His card reads: I am an Amateur Radio operator here in Springfield, Mo. I built a 6L6 transmitter 4 months ago and I have worked 47 states and have them confirmed. Also, using an ARC-5 receiver and the antenna is a half wave endfed 40 meter running east and west. I have never changed my rig. I need Vermont for my 48th state. I

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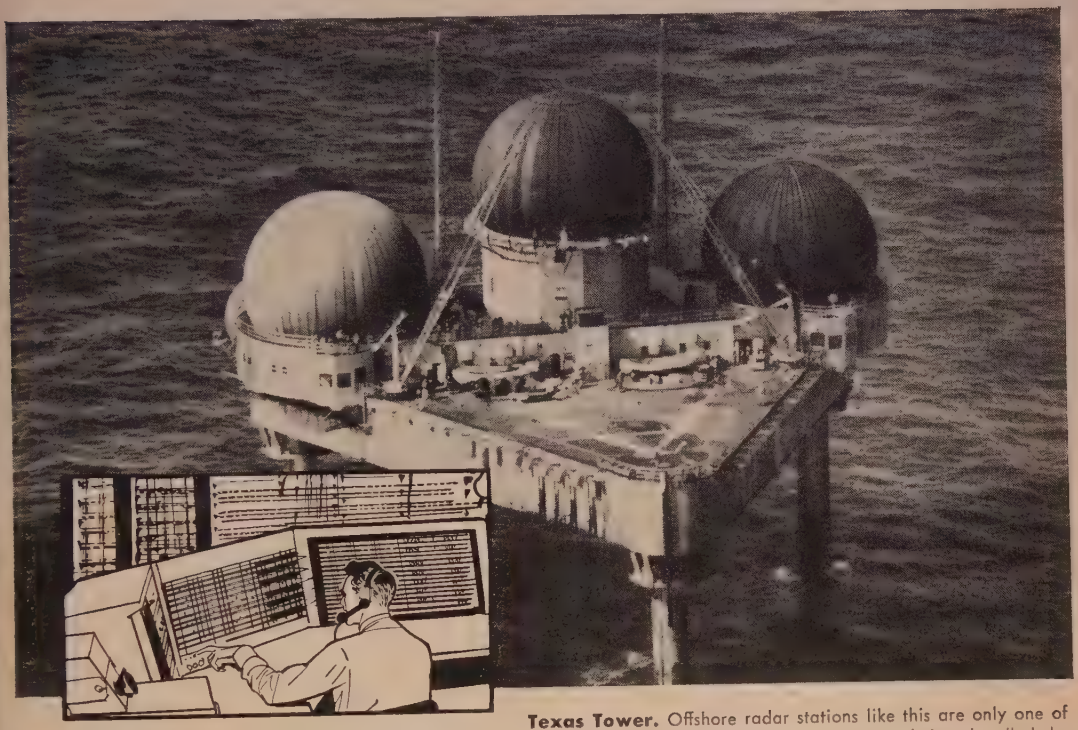

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FOR FURTHER INFORMATION CONTACT: D. P. Wilkes, W2LNC, Superintendent, Systems Testing; Western Electric Company, 220 Church Street, New York 13, New York. Or, if you prefer, telephone collect to: WOrth 4-0277.

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For further information, check number 47 on page 130.

A compact but effective station is owned by John Brooks, KN2VDO. He has made 20 contacts, in 12 days of operation on 40 meters.

would appreciate it if anyone in Vt. would make a sked with me on 40 meters, in the Novice band. TNX es 73's Clyde. *Aw come on, fellows, fix Clyde up with his WAS.*

Dave T. English, WN7EFX, Crystal Lake, Rt. 1 Woodinville, Washington tells us: Between school and ham activities, the QRM around here is up to par. When on the band, the sender is a box full of 15 watts and the receiver is an S-40B. The antenna which sendout my "kilowatt" is a short longwire. I have worked 13 states and VE, with Michigan my longest jump. 73's Dave. *Ok, and I hope you have your general ticket by now, but sometimes the FCC gets a little behind with them.*

A nice long letter arrived from Paul Taylor, Benham Avenue, Quaker Hill, Conn. and contained the following information: Thought I would drop a line to the new editor of the Novice Shack and wish U the very best of luck. I received my Novice ticket in October and made my first contact on December 1st. Since then I have worked 30 states with my DX being Washington. I'll sked anyone needing Connecticut for WAS. I'd like to know if there are any Novices in Vermont, as I have been trying to contact them. 73's Paul. *Sure there are Novices in Vermont, Paul, but you're so close, why not have a friend go up there and contact now?*

Another accomplishment is related by John Brookes, KN2VDO, 72 College St., Clifton, New York. Dear Don: I have made about 20 contacts in twelve days of operation with a total of nine states. The rig is a Heath DX-35 and an AR-3 receiver. All of these contacts were on 40 meters with a seventy foot longwire fed with 300 ohm line. My chief gripe is QRM from a foreign broadcasting station operating on my frequency. Sincerely yours, John Brookes. *Thanks for the letter and the photo, John. I know you do not mean it like it sounds, but it is not YOUR frequency. Your contract with the FCC (Form 610) says "I hereby waive any claim to the use of any particular frequency or of the ether" etc. Pardon the "soapboxing" but too many times you hear this on the general class phone band and they are convinced that it IS their frequency.*

The front of that head belongs to KN8BJA. Dick would like information on putting his Knight transmitter on Six Meters.

A letter from Dick, KN8BJA, 412 West Plane Street, Bethel, Ohio requests conversion information. Dear Don: I would like some information on putting a Knight 50 watt xmitter on 6 meters. The Knight xmitter is put out by Allied Radio. Has any such information been printed in CQ? I read CQ every month and enjoy it very much (DOESN'T EVERYONE?). I have had very good luck as a Novice, worked 32 states and Canada. I have made about 150 contacts. I have gotten some very good reports with this Knight so I would like to get in on 6 meters now. Any help will be greatly appreciated. I will be glad to sked anyone needing Ohio for WAS if they will drop me a line. 73, Dick. *Have you checked with Allied, Dick? Maybe they have that information. Have any of the readers any ideas for Dick?*

J. H. Goode, WN7DJW, 1817 W. Octave St., Pasco, Washington requests some theory. Dear Sir: I would appreciate it if you could tell me where I can find the theory of operation of the power supply section of the rig on page 63 of the January 57 issue of CQ. Capacitors C28 and C29 in particular. Thanks es 73's J. H. Goode. *This a voltage multiplying power supply om. See the novice column next month for an explanation of this type of supply, among others.*

Help Wanted

Charles E. Bell, 2619 Waterloo Rd Apt. 2, Stockton 5, Calif. Telephone HO-2-3506. Needs help with the code and brushing up on the theory.

Keith Russell, 1234 Post Rd., Scarsdale, N. Y. has an S-85 receiver and would like to become an amateur.

John Beck (14) 142 6th Avenue North, Glasgow, Montana has an S-41G receiver and would like help with the code and theory.

Glenn A. Pohl 21395 Inkster Rd., Detroit 19, Michigan Phone GR-49089 wants to become a Technician and needs help on learning the code.

Walt Bohlman, 32 Bridge St., Doylestown, Pa. needs help with the code and theory.

Roy L. Eger Rt. 1, Box 291-M, Leesburg, Florida would like to obtain an Amateur license, along with his daughter (age 13). He has a tape recorder (7½ i.p.s. full or half track) that he can play code tapes on.

E. R. Sheets, 117 South 4th Street, Red Oak, Iowa. Needs help with code and theory.

George Hogg, 31637 Auburn Drive, Birmingham, Michigan, needs help with code and theory.

E. W. Kangas (31), Box 165, San Jose Drive, Bisbee, Arizona needs help with code and theory.

David L. Krueger, 3933 Walsh, St. Louis 16, Missouri needs help with code and theory.

J. Samuel Fry, 94 White Oak Road, Amelia 3, Ohio. Needs advice.

Jim Botsford, 1317 Walenta Drive, Moscow, Idaho needs help with code and theory. Jim was the only letter from Idaho for W8ZCV.

Robert Chester Lieberman (13), 519 East 32nd Street, Paterson 4, New Jersey needs help with code and theory.

Well, that about winds things up for this month. Among other things, next month's column contains information on using the Heath QF-1 with ac/dc radios such as the Hallicrafters S-38 and SW-54, how to add a VFO when you obtain your General and a step by step construction project on a power supply for the above items. In addition, some modifications for improving the S-38 will be presented.

Best 73's DON, W6TNS

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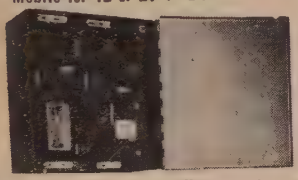
30 WATT TRANSMITTER BC-604
ORIGINAL COST $504.00
Mobile for 12 or 24 V. DC. **$9.95**



Our fortunate purchase allows us to pass on this tremendous bargain to you. Don't delay ordering as these won't last long at the price. A 30 watt 20-27.9 mc. 10 channel, push button control, crystal controlled FM transmitter that requires only power supply and accessories to put on the air. Meter switch allows use of single self-contained meter for checking and alignment. All tubes included which in themselves are worth more than our price. Ship. wt. 60 lbs. Guaranteed new to excellent..... **$9.95**
Circuit diagram on top cover.

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Unit comes complete in carrying case with spare parts but less batteries. Ship. wt. 55 lbs.
Batteries for above unit—$6.27 per set.

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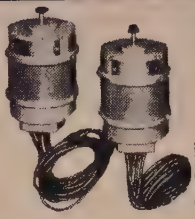
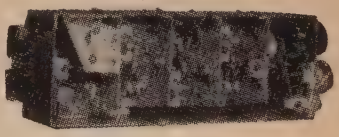


Simply connect like stator wires of each unit (marked with S on unit) and rotor wires (marked with R on unit) in series with 110 V. 60 cycle current, you have an electrical equivalent of a flex. shaft without usual limit to length, backlash error, and friction. Ideal for your beam direction indicators, wind direction indicators, antenna rotation, etc. Popular size 5 (6½" long 3½" dia.). Units orig. made for 400 cycle but operate intermittently on 60 cycle when connected in series as above. Ship. wt. 12 lbs. per. pair. Price per pair, used units..... **$4.95**
Regular 60 cycle units, per pair.....$9.95

R-1/ARR-1 Receiver

Brand New — $1.95
Tunes 238-256 Mc.



The ever popular 220 mc. rec. with conversion data as reprinted from January 1949 Radio-TV News. Brand new demilitarized (input coil base broken—easily repaired). Ship. wt. 6 lbs. **$1.95 each**

Co-ax relay for use with above receiver or other mobile equipment operates on 12 or 24 V. and can also be used on 6 V. DC. Ship. wt. 2 lbs. Original cost $12.45.
Your price, new—$1.25 ea.

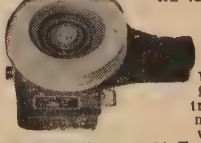
Antenna for ARR-1 Rec or other 238-256 mc. use. Car roof mount type with amphenol female connector in bottom of mounting base. Ship. wt. 2 lbs.
Price, new—$1.25 ea.

Freq. Crystals . . . Less Than 5c Ea.

Imagine crystals costing Govnmt $3.50 to $12.00 ea. in this assortment. 100 brand new; various freqs.; plenty in ham bands. Practically all types of holders; all mounted; guaranteed to oscillate. Assortment of 100. Ship. wt. 4 lbs **$4.95**

RL-42-B Antenna Reel/Motor

$2.50

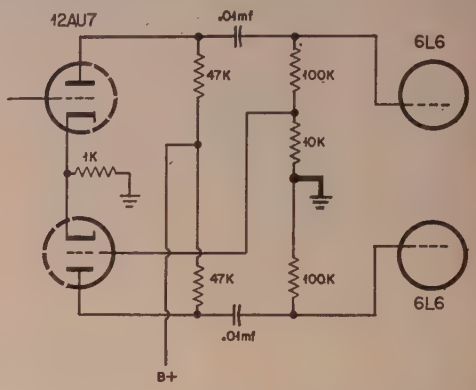


Used originally for remote controlling of automatic trailing wire antenna. Motor is ⅛ hp. x 24 V. DC with oil-less sleeve bearings. The gear train, breaking and disconnect mechanism, reversible and variable speed motor makes this an ideal unit for conversion to coil winders, etc. Ship. wt. approx. 5 lbs. $2.50.

ESSE REMIT SHIPPING CHARGE AND INSTRUCTIONS WITH ALL ORDERS OTHERWISE ORDER WILL BE SHIPPED EXPRESS COLLECT. ALL ITEMS GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED PREPAID WITHIN 10 DAYS OF RECEIPT.
RADIO CO. • 40 WEST SOUTH ST. • INDIANAPOLIS 25, IND.

For further information, check number 17 on page 130.

There is an error in the wiring diagram on page 35 of the March, 1957, issue of CQ. At the point in the grid circuit of the 6L6's, where the 10K and the 100K resistors are connected there should be a ground wire connected to chassis. The following diagram should clarify this:



Marvin Moss, W4UXJ

VOA

As part of its English language program "Panorama, USA," the *Voice of America* broadcasts an up to the minute shortwave propagation report and forecast every weekday at 1805 GMT (1:05 PM EST) on the following frequencies:

US Transmitters: 21650 kc. 17795 kc.
21540 kc. 15270 kc.
17830 kc.

Relay Transmitters:
Munich 7250 kc. Tangier 15130 kc.
9505 kc.

The forecast is repeated at 2100 GMT (4 PM EST) by Tangier on 9505 kc.

"XW8AB my eye, get in to supper."

For further information, check number 40 on page 130.

DX *(from page 83)*

working the boys (Feb. 26/27th) on 28650 and 21430 SB . . . Reg, departed from St. Martin on March 4th . . . FU8AC has been heard on 21120 c.w. . . . G3ANK sails for job in VK3-land on May 1st . . . ZK1BL has returned to New Zealand and awaits ZL call. QTH: Neil Marks, c/o Radio Section, PO, Wellington East, NZ . . . Word from VP2LU who runs a DX-100, long wire plus SX-96 inhaler reports 1250 contacts to date mostly on 14 c.w. and 21 A3. Other bands have been worked a bit which included a 160 meter QSO with W2QHH. Fred says VP2LH has been intermittently active from that base but expect to leave for stateside soon. Native VP2L—activity seems mainly confined to the 7 mc phone band . . . John, CR9AH, reporting from Macau, advises as follows: At present there are three active CR9's. The new ones are CR9AK andCR9AL, both c/o Post Office, Macau, they are active on 21 and 28 mc phone with CR9AL also using 14 mc phone. CR9AH operates 14, 21 and 28 phone and cw. All have beams. CR9AI will also be back on the air shortly . . . Bob ON4QX, rides again. This time it will be a weeks stay in San Marino sometime in June or July (dependent on permission) . . . W4HYW reports that W4NL/HH2OT is now back in Haiti for a three year stay. He has gear for all bands and signs HH2OT. QSL's should go via W4HYW and all will be answered via bureaus . . . W4VPD, Enos, plans week of VP7 operation from Bimini Island, in the Bahamas, this Summer, if license comes through . . . A "now it can be told" story comes from Bruce, W2VTR, Box 47, East Bloomfield, N.Y. who operated from Turkey in December 1955 under the call of TA3EF. Operation was cw during that month but, after official approval was obtained, many phone contacts were made in early 1956. An old Navy TA-4B rig was used plus dipole and HQ-140 . . . Danny, VP2VB/VR1B/VK9TW/VR4AA/FO8AN, appeared on the filming of the Groucho Marx show on Feb. 20th. We understand this show will be on the air in from 7 to 10 weeks (after Feb. 20th). It was not very rewarding financially as Danny was not allowed to choose subject (questioning) matter and only came out $50 richer. However some good plugs were made (if not later clipped) which may aid his cause, Danny was due to leave Los Angeles on March 3rd and head for Albuquerque, N. Mex. Visits are scheduled to be made at Denver, Las Cruces/El Paso, Houston, St. Louis and (possibly) Memphis before Danny shows up at the Dayton Hamvention in April. Progress seems "not-unfavorable" and should build up as publicity extends itself. After Dayton Club invitations include Alexandria, Washington, Charlotte, New York, Syracuse, Phila., Rochester (N.Y.) and Boston. Any ideas? Let KV4AA or W2NSD know via letter or QSO.

WPX

In February we looked back on the, more or less, routine operation of KV4AA for the month of January to see how we had made out towards the new WPX (Worked all Prefixes) Award. Somewhat surprised we saw that 159 prefixes had been worked as follow: AP2, CTI, CX5, DJ1-2-3, DL1-3-4-6-7-9, DM2-3, EA1-2-5-6-9, F3-7-8, FA8-9, FP8, FO8, FY7, G2-3-4-5-6-8, GM3, GI3, GW3, HB9, HP1, HK5, HC4, HC1, I1, IT1, K1-2-4-5-6-8-9-Ø, KP4, KX6, KH6, KR6, KL7, KZ5, KG1, KT1, LA3-4-5-6-8-9, LU1-3-8-9, LZ1, OE1-3-8, OH1-2-5-7-8-9, OK1, ON4, OQ5, OZ4-7, PAØ, PY2, PY5, PJ2, SM2-3-4-5-6-8, SL3, SP1-3-7-9, TF2-5, TI2, UA1-2-4-9-Ø, UB5, UR2, UH8, UM8, VK1-2-3-4-5-6-7-9, VS1-2, VE1-2-3-4-6-7, VO3, VQ6-8, VP5, VU2, VP9, W1-2-3-4-5-6-7-8-9-Ø, YU1-2-3, YO2-3, YN1, ZC4, ZL1-4, ZB1-2, ZS6, 9S4, 4X4-5 4S7.
(Now the QSL's !!!).

Let's hear how you made out and we will run a table on it.

73, Dick, KV4AA

Birminghamfest

One of the largest ham fests in the country will take place at Birmingham, Alabama on May 4-5. Write to L. B. Dorman, W4UEI, Hamfest Chairman, Birmingham Amateur Radio Club, Inc., P.O. Box 603, Birmingham, Alabama for a complete schedule of events. It starts out Saturday afternoon with rag chews and visits to local radio supply houses who will have open-house. Follows a dutch mass dinner and rag chew on into the night. Dutch breakfast Sunday morning and then everyone out to the Alabama State Fair Grounds for a full days entertainment. Meal tickets: $1.00, (barbecue); Attendance Prize Tickets $1.00. The fellow with the barbecue grease on his chin is the CQ editor, say hello to him. This is a CQ approved hamfest.

Bremerton

The Amateur Radio Association of Bremerton will hold its annual Hamfest May 4th at the Sons of Norway Hall, 1018 18th Street, in Bremerton. Registration will begin at 1300 followed by mobile hunts, code competitions, other activities, and display of prizes. A Banquet dinner will begin at 1900 during which there will be special entertainment and drawing of prizes. The rest of the evening will be spent dancing. Advance ticket price $3.50; $4.00 at the door. For further information contact Ray McCausland, W7UWT, 3236 Wright Ave., Bremerton, Wash., Telephone ESsex 7-5440.

Command Sets . . . now on the press. See page 119.

ASB-5 RECEIVER for 420 Mc BAND!

As featured in "CQ" for October 1956. Easily converted, makes a marvelous receiver for 420 band, with RF Amplifier! Supplied complete with all tubes, OUR LOW PRICE **$14.95**

Tuning Knob for ASB-5 Receiver $1.29

SCR-522 FINEST 2-METER RIG!

Terrific buy! VHF Transmitter-Receiver, complete with all components. 100-156 Mc. 4 channels. Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition. SCR-522 Transmitter-Receiver, complete with all 18 tubes. COMBINATION ..... Special **$33.33**

ARC-5 MARINE RECEIVER-TRANSMITTER

Navy Type Comm. Receiver 1.5 to 3 Mc BRAND NEW with 6 tubes **$16.95**

Navy Type Comm. Transmitter 2.1-3 Mc BRAND NEW with 4 tubes and Xtal **$12.45**

LORAN APN/4 OSCILLOSCOPE

Easily converted for use on radio-TV Service Bench!

BRAND NEW

Completely Assembled

Supplied complete with 5" Scope type 5CP1 and RCA 100 Kc. Crystal Unit **$14.95**

BRAND NEW SPECIAL PURPOSE TUBES

In Original Individual Packing

JAN CRP-730A MAGNETRON, Raytheon $3.45

Type	Each	Lots of 12	Lots of 100
6J6W	$.45	$5.15	$41.00
1625	.26	2.75	21.50
1626	.16	1.75	13.50
1629	.27	3.05	23.95
826	.44	4.95	39.50
21724B	.35	3.95	29.50
VR105	.79	8.88	70.00
VR150	.79	8.88	70.00
8002R	5.95	.....	.....
RK65	7.25	.....	.....

NEW! Cathode Ray Tubes NEW!

3CP1	$1.18	5BP4	$2.22
3FP7	1.18	5CP1	2.45
5BP1	2.22	9LP7	1.88

FL3-A RADIO FILTER $1.79

DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—BRAND NEW ..... only **$2.95**

HI-FI DYNAMIC HEADSET WITH RUBBER CUSHIONS

Freq. Range: 40-14,000 CPS. No distortion. BRAND NEW **$5.95**

DYNAMIC Headphone with Dynamic Mike, BRAND NEW, complete **$3.95**

MICROPHONES

Model		Excellent Used	BRAND NEW
TS-9	Handset		$4.95
T-17	Carbon Hand Mike	5.45	$7.95

CD-307A Cords, with PL55 plug and JK26 Jack ..... .99

DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug. BRAND NEW, special **$2.95**

2" ROUND PANEL METER, 1-mil movement, 0-30 V scale. Standard Make. New! **$2.65**

AN/ARR-2 RECEIVER

BRAND NEW—A Terrific Value! Tuning Range 234 to 258 MC. Tubes: 7-9001, 2-6AK5, 1-12A6. Only a few at this low price! Complete **$8.88**

With 28V 1.6A Dynamotor, complete $12.98

110 VOLT AC POWER SUPPLY KIT for above $7.95

BRAND NEW WOBBULATOR, Special! $4.95

WRITE FOR FREE CATALOG!

Please include 25% Deposit with order — Balance C.O.D. MINIMUM ORDER $3.00. All Shipments F.O.B. Our Warehouse N.Y.C.

G&G Radio Supply Co.

Telephone: CO 7-4605

53 Vesey St., New York 7, N. Y.

Ham Special! Famous BC-645 Transceiver

BRAND NEW

With MANUAL for Easy Conversion to CITIZENS' BAND!

Makes wonderful mobile rig for 420-500 Mc. Easy to convert for phone or CW 2-way communication. This swell rig originally cost over $1000—yours for practically a song! You get it all, in original factory carton, BRAND NEW, complete with 17 tubes, less power supply. Conversion instructions included. **$29.50**

Shpg. wt. 25 lbs.

PE-101C DYNAMOTOR for BC-645, has 12-24V input (easy to convert for 6V Battery operation) ..... only **$7.95**

UHF ANTENNA ASSEMBLY, for BC-645 ..... $2.45

Complete set of 10 Plugs for BC-645 ..... **$5.50**

CONTROL BOX for above $2.25

SHOCK MOUNT for above 1.25

CONVERSION BOOKLET. Instructions for most useful surplus rigs **$2.50**

ARC-5/T-23 TRANSMITTER

VALUE $100.00!

2-Meter Transmitter, 100-156 Mc. Limited Quantity, Special Offer. Excellent used, comp. less tubes **$5.95**

Brand New, complete, less tubes **$7.95**

DYNAMOTOR VALUES!

Type	Input	Output	Excellent Used	BRAND NEW
DA-19-A	28V 11A	400V .400A	$4.99	$6.95
DM-28	28V	224V .07A	2.95	4.95
DM-32A	28V 1.1A	250V .05A	2.95	5.95
DM-33A	28V 5A 28V 7A	575V .16A 540V .25A	1.95	3.95
DM-34D	12V 2A	220V .080A	4.25	5.50
DM-37	25.5V 9.2A	625V .225A	5.95	8.95
DM-40	14V 3.4A	172V .138A	1.75	3.45
DM-53A	28V 1.4A	220V .080A	3.95	5.95
DM-64A	12V 5.1A	275V .150A		7.95
PE-73C	28V 20A	1000V .350A	8.50	11.50
PE-86	28V 1.25A	250V .050A	2.95	5.24

PE-103 6/12V Input, 500V @ 160 Ma output. With cables and plugs, excellent, like new **$24.50**

DM-32 type Dynamotor, input 12V @ 2.4A; output 250V @ .060 A, BRAND NEW **$5.95**

EICOR CONVERTER 12V, 4A to 24V, 2A and 24V, 4A to 12V, 8A. BRAND NEW **$5.95**

R24-ARC/5 NAVY TYPE
(Similar to BC-946)

BROADCAST RECEIVER

520 to 1500 Kc. 6 tubes: 3—12SK7, 12SR7, 12A6, 12K8. For dynamotor operation. Easily converted to 110 or 32 Volt. 2—IF stages, 3-gang tuning cond. Complete with all tubes, in original sealed carton. **$19.95**

BRAND NEW

BC-457 TRANSMITTER—4-5.3 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**

BC-458 TRANSMITTER—5.3 to 7 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**

BC-459 TRANSMITTER—7-9.1 Mc, complete with all tubes and crystal. BRAND NEW **$11.95**

ARC-5/T-19 TRANSMITTER—3 to 4 Mc. BRAND NEW, complete with all tubes & crystal **$8.88**

SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

Type	Description	Used	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	$9.95	$11.95	$14.95
BC-454	Receiver 3-6 Mc	7.19	8.29	11.95
BC-455	Receiver 6-9 Mc	5.25	7.95	9.95
BC-456	Modulator	2.24	2.75	4.24
ARC-5/T-19	Xmtr 3-4 Mc (like new)		6.95	8.88

110-VOLT AC POWER SUPPLY KIT

FOR ALL 274-N and ARC-5 RECEIVERS

Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. No wiring changes needed. Complete kit of parts with metal case, instructions **$7.95**

SPLINED TUNING KNOB for 274-N RECEIVERS. Fits BC-453 BC-454 and others. Only **49c**

TG-5-B TELEGRAPH SET

Made for USA Army Signal Corps. A dandy little field set for 2-way communication. Sturdy metal container, 6¾"x4¼"x4", with hinged covers, complete with telegraph key and headset. BRAND NEW, in carrying case with shoulder strap **$9.95**

Used, exc. Cond. $7.95

After noting the reading on the field strength meter, look at the plate current. Whether it is over or under 160 mils, tune C^1 for a dip in the plate milliammeter. If dipping with C^1 does not bring the plate current to 160 mils, leave C^1 and tune C^2 to where the plate current reads 160 mils.

Now, re-dip C^1 and continue until the plate current dips to 160 mils. This jockeying back and forth between C^1 and C^2 requires *only minor adjustment of the condensers.* If the antenna, amplifier and π network are properly designed optimum reading on the field strength meter will be obtained when plate current is dipped to 160 mils.

In tuning C^1 and C^2 it is well to establish a definite routine and never vary from it. Since C^2 is the load condenser, get in the habit of setting C^2 first. Then C^1 should be tuned for dip. Think of, and say to yourself, "Load" and "Resonance" as you first twist the knob of C^2 and then the knob of C^1. This is a most important habit to get into.

It is possible (and don't think it isn't being done every day) to seemingly 'load' that amplifier with C^1. Meter readings look the same. But, instead of loading the amplifier, this error is actually tuning the amplifier out of resonance. At a time like this the field strength meter is indispensable. For while the plate milliammeter showed the amplifier current coming up to normal, the field strength meter would show output falling off.

Where a tapped instead of a rotary inductance is used for L, the following procedure is a simple means for locating the proper places for the taps. Steps One and Two should be followed as with a rotary inductor. Step Three is changed as follows;

With the plate voltage *OFF,* couple a grid dip oscillator tuned to the desired frequency, to the *PLATE* or C^1 end of L. Now, start shorting turns from the opposite end of the coil. When resonance is indicated on the GDO, that is where the tap should be placed.

Remove the GDO, turn on the plate voltage and continue the tune up procedure as previously outlined. If the amplifier is to be operated on several bands, repeat the same process for each band.

The telling is more complicated than the tuning. Once the "feel" of this tune up procedure becomes profound, this procedure becomes virtually automatic. This can only result when good habits are established at the start. C^2 is always tuned first and C^1 always tunes the plate current to dip. Remember, "Load" and "Resonance"!

Bear in mind that a π network will properly

AMATEURS! THIS IS IT! ABSOLUTELY THE HOTTEST YET! READY-TO-GO. FACTORY WIRED MOBILE TRANSMITTER-RECEIVER!

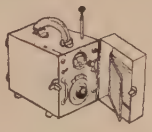
Ask the southern W6's and K6's about the **BLACK WIDOW**! Now introduced nationally for the first time! Heaters wired for quick changeover 6 or 12 V. Uses your car radio speaker to reduce size and cost. Requires external power supply 300 V., 200 ma, not included. Only 9" wide 5" high, 6" deep. Hang it under the dash! Built-in tune-up meter also serves as S-meter. Crystal plugs into front panel for quick, easy, frequency change. (VFO plug-ins now in the works, will be ready soon.) 8 WATTS OUTPUT! Very sensitive and selective band-spread superhet receiver with vernier tuning and large calibrated dial.

220 MC: Cat. 27-611 TXR12-CQ	$165.00
2 METERS: Cat. 27-611 TXR9-CQ	165.00
6 METERS: Cat. 27-611 TXR10-CQ	165.00
10 METERS: Cat. 27-611 TXR11-CQ	165.00
115 V. POWER SUPPLY: With speaker. Cat. 13861 PS2-CQ	27.50
UNIVERSAL POWER SUPPLY: With speaker. 6 V., 12 V. or 115 VAC. Cat. 4761PS3	36.50
PLUG-IN VFO: Instead of crystal. Now in the works. May be ready soon.	
NOTE: We have a limited number of 12 V. surplus dynamotors to supply The Black Widow. Sold only with Black Widow purchase. Ea.	6.95

BENDIX 100 WATT TRANSMITTER! FOUR SEPARATE ELECTRON-COUPLED OSCILLATORS!

Can be easily converted to 10-20-40-80 meters. Crystal required for 10 meters. Each electron-coupled oscillator dial has 3,000 divisions enabling quick, precision shifting. Constructed of highest quality parts with laboratory precision. Four separate output tanks, one 4-position selector channel switch has seven sections which change the ECO, IPA and output tank **simultaneouly**! ALL controls mounted on front panel. The housing is cast aluminum, shields and case are sheet aluminum. 11" x 12" x 15". Ship. wt. 45 lbs. Complete with instructions and schematic. Uses and includes 3-807's and 4-12SK7's. Has a 2-inc 5-amp R.F. output meter. **Only one knob (center) selects 10-20-40-80 meter bands.** A complete coverage transmitter, for the new or experienced amateur. A TRUE HAM VALUE—COMPLETE WITH TUBES. Excellent condition. Cat. 3861TX15-CQ. **$27.50**

FREQUENCY METER BARGAIN!



BC906 is also a wonderful **Grid Dip Meter** and **Relative Field Strength Meter**! Frequency 144-225 mc. covers VHF communications and upper TV channels. You tune a silver-plated cavity to resonance with a large National Velvet Vernier dial. A probe in the cavity feeds the diode plate of a 1S5 and the rectified negative voltage applied to the grid of the same tube dips the plate current as shown on a 0-500 dc microammeter. The dial is individually calibrated with a curve showing 100 kc per dial division. The entire unit is in a compact carrying case only 12½ x 8¾ x 6½" with a leather handle. Schematic is pasted inside. Includes plug-in antenna. Specs inside for one ea. 1.5 V. and 15 V batteries. This precision laboratory device is in excellent condition. **$7.95**

COMMUNICATIONS RECEIVER

RCA's CRV-46151 6-tube superhet 195 Kc thru 9.05 MC. Very sensitive. Includes RF stage. Sharp and broad selectivity. Has AVC-MVC switching and BFO. You may replace the dynamotor with an AC power supply. Dope sheets and schematics included. Excellent cond. Shpg wt. 30 lbs. Cat. No. 3806RE5CQ Only **$19.95**

MOUNTING RACK $2.50

VHF CHECKER WITH SCOPE DISPLAY 150-240 mc

Brand new unit made for Air Forces, so you know that it is made right. Signal generator feeds pulsed RF to your receiver. Output of your receiver is displayed and measured accurately. Built in AC power supply 115 V. any frequency from 50 to 1200 cy. Also use the scope to analyze Hi-Fi amplifiers by pulsing its sweep from your square-wave generator. Each sweep will present one complete pulse from your amplifier's output. Shpg. wt. 50 lbs. A $1200 set. BRAND NEW, **with all tubes and instruction book,** for only **$42.50**

6 VOLT SEALED RELAY

ADVANCE has two sets of SPDT contacts and two pair of SPST Normally Open contacts, H.S. in small can with schematic on the case. In can, weighs 3½ oz. Out of the can, only 1¾ oz. New! Cat. 206RY29-CQ. Only **$1.95**

NARROW YOUR PASS BAND

With this NEW U.T.C. Radio Range filter with switch, cord and phone plug, and phone jack. Cat. 1206TF2-CQ. Only **$1.95**

THE BEST PORTABLE MOBILE 10 & 6

The best for back-pack and automobile. 28-80 MC. AM. Modifications necessary for amateur use are easy and explicitly shown in simple instruction sheet furnished with your order. This is the famous Marine Corps TBY. Original power supply not included, but power supply which you can use is spelled out in these instructions. Excellent condition with tubes. You also get an AN-75 antenna and the original TBY headset and mike with the cord and plug to fit. All this for only **$24.50**

420 MC SPECIALS

RECEIVER: 46ACJ has double-conversion. Uses 13 tubes. Three 446-A Lighthouse Tubes tune 450-500 mc, and you retune only the oscillator. We give you schematic and instructions. First IF of 55 mc is amplified in 2 stages. Second IF of 16 mc has 4 stages. Detector is followed by two stages. Brand new. Includes 8-6AC7, 3-46A, 1-6AG7. 1-6H6. Only **$9.95**

If you have lots of 6AC7's get it less these only at $6.95

TRANSMITTER: 30 Watt TV transmitter. Uses 4-8025. 2 as 250-385 mc P-P osc. driving the other two as PA. The PA is grid modulated by a 3-tube video ampl. and plate-mod by a 3-tube sync ampl. New with all tubes. schematic and instructions for easy conversion to 420. Only **$15.75**

WIDE-PASS TEST SCOPE & 455 KC PANADAPTOR

Both in one compact unit! Brand new with schematic. Also 5.25 and 30 mc. inputs. The only modification required is to replace only one power transformer with 60 cy. units we show you how to find in your hell box and how to connect ID-60/APA-10. A gem that cost govt. $1,000! Cat. 14061SC1CQ **$39.50**

SEND FOR OUR FREE FLYER

All shpts. FOB whs. Send 25% dep. with all C.O.D. orders. Item sub. to prior sale & change of price without notice. Min. order $2.50.

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California Distributors' Stores
G. L. Electronics Inc., 1632 Venice Blvd., Los Angeles
P.A.R.T.S., INC., 8905 San Fernando Rd., Sun Valley

For further information, check number 3 on page 130.

load anything from a hair pin to a long wire. Thus, if the final does not load up the way it should there are two probable causes for this failure; (1) an error has been made in tune up procedure and (2) the antenna is at fault.

As to the former, start from scratch and go through this procedure step by step. When this has been accomplished and the problem still exists it might be well to take a good look at that antenna[3] and see if re-design might not be desirable. ■

1 "Pi-Network Tank Circuits", Pappenfus and Klippel, CQ, Sept., 1950
"Further Notes on Pi and L Networks", Pappenfus and Klippel, CQ, May 1951
"Simplified Pi-Network Solutions", Hoefer, CQ, Nov. 1953
2 "Linear Tips", McLaughlin, CQ, March 1955
3 "Antenna Design", McLaughlin, CQ, August 1955

Grounded Grid *(from page 38)*

pieces of scrap aluminum 4 × 8 inches and a 4 × 8 × 2 inch aluminum chassis serves as a mounting box and shielding enclosure.

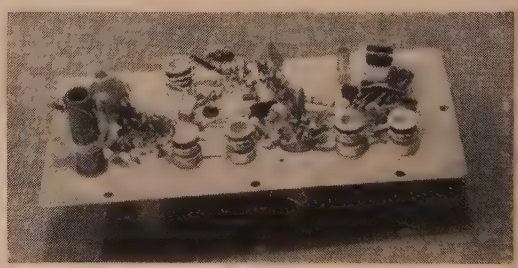


Fig 2

Fig 3

The two meter converter of *fig 3* has a noise figure of 4 to 5 db and a ¼ microvolt input signal can be copied with an average receiver connected as the i.f. system. The noise figure of the 50 mc converter of *fig 2* runs around 3 db while that of *fig 1* runs about 4 db when tuned up carefully. The image rejection runs between 60 and 80 db on all of these converters. ■

Six Meter Mobile

Coil data for the transmitter on p. 30 Feb. '57 CQ is as follows.

L1—5 turns #26 enamel, ¾" dia., ⅜" long.
L2—2 turns #26 enamel, ¾" dia., ⅛" long.
L3—Same as L1
L4—Same as L2

SAVE!...BARGAINS GALORE!...SAVE!

NEW LOW PRICES! — EFFECTIVE APRIL 1st

COMMAND TRANSMITTERS & RECEIVERS

ARC-5 and SCR274 as available

BC 455

XLNT.....$5.95

NEW.....$7.95

Receivers, w/o dynamotors

R-25 Marine, 1.5-3 MC, new.....$10.95
R-26 or BC-454, 3-6 MC, used $6.95. New..... 7.95
R-27 or BC-455, 6-9.1 Mc, used $5.95. New..... 7.95
R-28, 100-156 MC, Exlt..... 13.95
R-4/ARR-2, 234-258 MC, as is w/o tubes, $2.95, w/tubes, used 4.95

Transmitters, w/o modulator or dynamotor

T-18 Marine, 2.1-3 Mc, as is, w/tubes, 3.95, used 4.95, boxed 7.95
T-19 or BC-696, 3-4 Mc, as is w/tubes, 6.95, used 7.95, new 8.95
T-20 or BC-457, 4-5.3 Mc, as is w/tubes 2.95, used 3.95, boxed 5.95
T-21 or BC-458, 5.3-7 Mc, as is w/tubes, 2.95, used 3.95, boxed by depot 4.95
T-22 or BC-459, 7-9.1 Mc, as is w/tubes 3.95, used 5.95, boxed 8.95
T-23, 100-156 Mc, xmitter used, 13.95, xlnt..... 14.95
Special—1 R-28 Rec. & 1 T-23 xmitter both..... 25.95

Misc. Command Equipment as available

Receiver dynamotors 28V, used.....$ 1.00
BC-456 SC Mod. w/tubes, new 4.95, used..... 3.95
MD-7 ARC-5 Pl Mod w/tubes less dyn. Xlnt..... 8.95
28 v dynamotors for above unit..... 3.00
3-Rec. Rack, used, 1.49, new..... 2.49
New 2-Trans. Rack..... 2.95
New 24V Trans, 1A..... 3.50
Plugs for rear of receiver..... 1.00

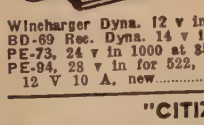
110 VAC power supply for ARC-5 & 274N Recvrs kit 8.95, Wired & tested 12.95

Receiver Conversion kit: cont. schematic, BFO Sw, 25 K Pot. phone jack and knob, with instructions..... 1.95

1625 Tubes, for trans # mod, 50¢....3/1.00

Popular Dynamotor Specials

DM-34 Recvr. Dyna, 12 V in 220 @ 80 ma Out, new 4.95
DM-36 Same as above, 28 V. new..... 4.95
either of above, used..... 3.95



PE-101C Dynamotor, 12 or 24 v input, 500 v at 200 Ma out, (300 v 6v in) new..... 10.95
DM-42, 12 V in. out 1000 and 500, ea at 215 Ma. used 12.95
DM-35, 12V in, 600 at 200 Ma out, Like New 12.95
Wincharger Dyna. 12 v in 440 @ 220 MA Out, new..... 12.95
BD-69 Rec. Dyna. 14 v in, 220 at 80 MA out, new 9.95
PE-73, 24 v in 1000 at 350 Ma out. New 8.95, used..... 6.95
PE-94, 28 v in for 522, 300 at 250 Ma, 150 bias, and 12 V 10 A, new..... 4.95

"CITIZEN'S BAND!"

420-465 MC. TRANSCEIVER. This is the famous APN-1. In excellent condition, complete but less tubes. Just remove the wobulator (which alone is worth $2.50!) and add a sweep generator. Special! **$2.95**
This month only.....

SIGMA 4F 8000 OHM SENSITIVE RELAY. Pulls in at 1.6MA release at .75 MA. SPDT 2AMP contacts removed from new equip. guaranteed $2.95
BC-654 Transceiver: 3800 to 5800 KC..... Used: 34.95

Cathode Ray Tubes

5HP4 or 5CP1 .....New 1.98
7BP7 .....New 2.98

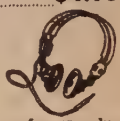
WESTON—SANGAMO—YOUR CHOICE

METERS.	ALL NEW	2" SQUARE
0-2 Ma	0-300 Ma	
0-5 Ma	0-500 Ma	$3.29 ea.
0-15 Ma	0-20 VDC	SPECIAL
0-50 Ma	0-40 VDC	
0-100 Ma	0-300 VDC	3 for $9.00
0-200 Ma		

Heavy Duty Collins choke 4 Hy-300 Ma can take 500 Ma peaks, new 3.95
Bantam 1-watter, BC-746 plug-in transmitter tuning unit from WALKIE TALKIE. 140 mmfd APC type variable cond. plus assorted parts including chassis. Builds into low power transmitter (See CQ March '54) .....New, $1.29

COIL CONDENSERS

2 mfd 5000 vdc new.....$5.95
2 mfd 1000 vdc new..... 1.95
10 mfd 600 vdc new..... 1.49
8 mfd 600 vdc new..... 1.49
4 mfd 600 vdc new 3 for 1.00
2 mfd 600 vdc new 3 for 59¢
Mobile Microphones, newly assembled, W.E. D173015 similar to the TC-128, push-to-talk switch, 3 cond. **$3.95**
5' curl, cord, new.....
Chest Mike T-26 w/F1 Button New.....$1.49
F-1 Carbon Mike Element.....59¢
RT-48A/TPX-4 IFF Trans-Receiver 157-167MC. Complete with Tubes, used, xlnt. Makes nice 2 Meter Rig.....$12.95
BC 655 Signal Generator Range 17.5 to 160 Mc. good for T.V. set alignment, use as transmitter fre. checker, built in 0-200 Ua. Triplett 2" round Meter New.....$19.95
Brand New Headphones, HS-23, 2000 ohms, $3.95 HS-33, 600 ohms, complete with brand new rubber cushions **$4.95**
New small cushions, pr..... .49
Used chamois cushions, pr..... .49
New lg rubber cushions, pr..... .29



Brand new Impedance matching transformer, plug in, 2000 ohms to 600 ohms, takes std plug, boxed 69¢ each, 3 for..... **$1.95**

CD-307A cords, has JK-26 on one end for phones, std plug other end brand new, boxed ..... **$ .97**

Stewart Warner Ammeter, 60-0-60 Amps. brand new, 95¢ 6 for..... 5.00
Phone-CW Filters, 1020 cycles, new, FL-5, 69¢ FL-8 with switch 1.89
GP-7 transmitter with all tubes less 803 tube and 80 meter coil unit only..... 13.95
less tubes and coil unit..... 7.95
TU-7, 4.5-6.2 MC; TU-8, 6.2-7.7 Mc; TU-9, 7.7-10 MC; TU-10, 10-12.5 MC; TU-26, 200-500 Kc, choice, used, for BC-375 transmitter, each..... 2.29
T-30 Throat Mikes, used, 5 for..... 1.00
3' Mast Sections, MS-49 thru 52, 50¢ each. 53 and above, 75¢ each. Special 1 each MS-49 thru 54, makes 18' vertical 2.95

MN-26C direction finding Equipment
MN-26C Receiver w. dyna..... 10.95
MN-20E Loop 4.95
MN-52H Az Cont Box..... 2.95
All above new, special, 1 each for.... 17.95

Antenna Insulators. Bendix MT-48C, plated end caps, new 15¢ ea., 10 for 1.25
Control Box w/5 Ma S meter, special 1.98
SCR-522, exc. condition. Contains Receiver, Transmitter, Modulator, tubes, tunes 100-156 MC, covers 2 m w/o modification 29.50
New transmitters, GF-11 for 12 volts, or GF 12 for 24 volts, with tubes and built in modulator—less tuning unit, GF-11 $8.95.....GF-12 8.95
BC-223 Xmitter New With all Tuning Units..... 29.50
Used W/One Tuning Unit..... 18.95
BC-434 Control Box W/5 Ma' "S" Meter Used..... 1.95
T S-24/ARR-2—Calibration Test Set for R-3/ARR-2 Receiver New 8.95

TG34 or TG10, 1 Hour Code Tapes

No. 10, No. 15.....New, ea. 1.25

2.00 Minimum Order. All prices Subject to Change without Notice. Canada & Mexico minimum 10.00. Cash with Order. Sorry, no COD. California Orders Include 4% tax. Prices FOB Los Angeles

SAM'S SURPLUS, 1306 Bond St., Los Angeles 15, California

For further information, check number 88 on page 130.

QSL Contest

Winner of the seeming unending subscription to CQ (two years) in this month's contest is W2KR. A quick look into the SSB section this month will show you that this same call appears on top of the countries-worked heap. So it not only looks good, but it works good.

Walkers-up have to be satisfied with the international fame of having their cards reproduced here. Too bad. Maybe next month you can utter an oath as you find you are merely a walker-up. If you send in your card you will at least have a chance to anyway.

my own, or is it to be expected, or what, if anything, can I do about it. Your help will be appreciated.

H. L. Osteen
1646 Marfa Ave.
Dallas 16, Texas

Anybody help him?—Ed.

Schools

Dear Wayne:

Here is a little stunt that was pulled around this area a short time ago. It seems that according to tradition the South Car. U. comes up to Clemson just before the game paints up the campus, etc. This year the Hams organized their mobiles and tracked the S Car. U gang and was able to catch 27 red handed, and shaved their heads. Another victory for Ham radio.

Tiny Brain
Derby, Connecticut

Dear Wayne,

Hats off to the boys for the wide variety of antennas attempted. I wonder if anyone can top my entry in the race for novelty and effectiveness: A two element twenty meter beam topped by a fifteen meter quad! The beam works very well, to be sure, but the quad is superb. In just a few months I have made WAC, WAS and am well on the way towards several other awards. For those interested, the dimensions of the quad are: 11'-4" for each leg, 9'-9" separation of the elements, and 300 ohm feed line to a Matchbox and Viking II.

Enclosed are a photo of the antenna, my shack, and my QSL. I try to QSL 100%, so if anyone has been overlooked I'd appreciate a little reminder. Before closing, Wayne, let me just say one thing: CONGRATULATIONS to you and your staff and all the ham contributors to *CQ* for making it what it is: A treasure—from cover to cover.

Fr. A. J. Hanchak, C.PP.S.
(Fr. Gus)
Santiago, Chile

■

Santiago, Chile

Antenna at CE3TH

YL *(from page 87)*

QTH is 2183—44th Ave., San Francisco, and the club meets the 3rd Friday of each month.

Members of WAYLARC "adopted" for YLRL membership DJ1TE, Christa Huber. Some future activities of the Washington club include a luncheon meeting with members of the Penn-Jersey YL ARC at the Watergate Restaurant the first or second weekend of April, depending on the blossoming of the cherry trees. On June 9th a barbecue and shack visit is planned at the new home of Ethel, K4LMB, in Arlington, Va.

The Texas YL Round-Up Net celebrated its second anniversary Nov. 17th with a luncheon at Pier 21 in Houston, Tex. with 32 YLs attending from Texas, Okla. and La. The YLs in the Dallas area will be hostesses for the next net party to be held in Nov. 1957.

After-The-Net Net

Ever hear of the After-The-Net Net? Take a listen some Tuesday evening on 3910 kc. when W9SWD closes the Indiana Fone Net and turns the frequency over to K9AMD and the After-The-Net Net. A strictly informal affair, the ATNN has met continuously since a spontaneous charter meeting in March 1956. NCS is K9AMD, Carole, in Hillsboro, Ill., who was only 20 when she took on her task. Last summer on her 21st birthday she received gifts, flowers, a cake and many cards from ATNN members.

Carole is one of an all-Ham family. Her mother is K9AXS, Golde; her dad is W9VEY, Dan, and her brother is W9EZA, Danny. Carole started with a Novice license in June, 1955 and made General that Sept. K9AMD uses a B&W 5100 and an HRO-60 receiver. The antenna is a doublet with multi-band traps. Other than 75 which she works mostly, K9AMD is on 20 meters. She also serves as publicity chairman of the Montgomery County Amateur Radio Emergency Corps. Carole works as an insurance secretary, and other interests include piano and the Hammond organ.

YLRL News

YLRL President W3PVH has appointed W8RIR, Beth, as chairman of the nominating committee for 1957. . . . At the time of elections the D/C for 2nd district resulted in a tie. The D/C is K2DYE, Jessie Learned, RFD 1, Lacona, N. Y.

YL Nets

YLRL VP W3YTM/5, Mildred, tells us that W9GME, Grace, has resigned as NCS of the 10-meter Hair Pin net due to other obligations. K6EXQ, Connie, is the new NCS, with W7YFQ, Dee; W7WLX, Ethel; W5EGD, Lillian, and KØAUJ, Alice, alternates. . . . W1YPH, Leona, reports that the Wed. CW net has chosen the name East Coast YL Net. She invites all YLs to

check in on Wed. 9 p.m. EST 3610 kc. . . . K4APF, Anne, invites all W4 YLs to join the Southern Belle Net on 3920 kc. each Thurs. at 0800 CST. . . . W4BIL, Fran, invites all YLs to join the Florida Net which meets each Mon. at 0830 EST around 7210 kc. with W4BWR, Ruth, as NCS.

Here and There

To W6EHA Gen, we extend deepest sympathy in the loss of her OM W6EHB, "Cotton," on Dec. 18, 1956. . . . Congratulations to WN8AXA, Betty, and W8QFA, on the arrival of their 5th "harmonic" in Jan. . . . To W3VNN, Shirley, and W3HTF, on arrival of a girl on Dec. 12.

W6UHA, Maxine, has enjoyed QSOing the YLs in Africa each a.m. and also working Russian YL UA4KHA, Wera. Maxine is up to 229 countries confirmed. . . . An FB article about W9JYO appeared in her local newspaper in Dec., titled "Mrs. Santa Claus often stays at radio until 3:00 a.m. sending greetings to men in service." Thelma handled over 3,000 messages in Dec. on MARS and the Ham bands and earned the BPL medallion. . . . Did you read the article on Field Day by W3DBN, Flo, in Dec. CQ? If not, get out your copy—it's FB.

33. Louisa. W5RZI

DX Contest

(from page 89)

Regarding the publication of results, you're way off on that one, Cliff. Certainly you cannot expect a more complete coverage of the scores than we had last year.

There were other gripes, some justifiable.

CR6AF condemned the practice of W's that continued calling him even tho he was trying to work another country to increase his multiplier.

VQ4GF—Complained of non-contest stations wasting his time asking for a QSL and then saying "not in contest."—Needless to say, their chances of getting a card are pretty slim. They were probably the same guys who write to us for WAZ confirmation from a contest log but never bother to send in their own report.

VE3EU—"More fun than a barrel of monkeys, and I'm sure I heard a few in the pile-ups." *The Simian variety, no doubt.*

K6ICS—"Watt a week-end."—To which W6AM adds "Amen." (See photo.)

See our next issue for a full report and all scores and winners for the Phone Section. ■

Oregon Convention

The Valley Radio Club announces that the 1957 Oregon Amateur Radio Convention will be held in Eugene on April 13-14. There will be over $1000 in prizes, lectures, new equipment displays, and a Swap Shop. Registration is $8, non-hams $4.50. Write L. J. Oswald, W7SPB, 751 E. 14th St., Apt. 7, Eugene, Oregon.

RTTY *(from page 64)*

a few printers changing hands locally, so a few new faces are showing up. W7HZV has a Model 15 and has it on the air using a single 6146 transmitter and an SSB slicer as the main part of his TU. This is very interesting in itself in that it can tune any shift and uses no tuned circuits in the TU. WN7DBJ just acquired W7PCV's Model 26 and will soon be heard on all bands as he is about to get his General ticket. DBJ is using a W2PAT converter and is brainstorming with HZV on the design of a new TU. Activity is picking up as we just pioneered 2-meter RTTY with AFSK in this area on 147.15." George thinks more tape gear is available on the east coast than on the west coast. Ha.

W5PCN, of Amarillo, Texas, reports the possible application of VHF RTTY in a local March-of-Dimes Telethon. Gib also volunteers to help anybody in his area with mechanical machine problems. This column will soon carry a detailed description by Gib of the Wheatstone 1-F polar relays, which are, ". . . being retired from service in the communications industry in fairly large numbers."

KL7RU, in Ketchikan, Alaska, is just getting started in RTTY. Jim, did you see the article on page 56 in the November 1955 *CQ* by KL7CK, "AFC for RTTY?"

Comments

Last minute mail indicates that several RTTYers have been bilked on tape gear ordered from an outfit which seems to make it a practice of not delivering for long periods of time, or longer. These particular instances involve the ordering of *perforated* (wide) tape gear, very much in demand right now. When delivery was finally made, the equipment turned out to be narrow "ticker-tape" equipment—useless for retransmission. If you *have* to order tape gear through the mails, check first with several of your more active RTTYers. *Caveat emptor!*

73, Byron, W2JTP

W2VLL, Lewiston, N. Y., operated by Dave Vanderhoek. Equipment consists of a W2PAT converter with toroids, an SX-28 receiver, 40 and 80 meter command sets modified with diode frequency-shift keying—used as VFO's, and a 400-watt transmitter with 812A's in the final

SB *(from page 71)*

participating. The net meets daily at 2000 EST on 3985 kc.

The Single-Side-Band Dinner to be held in New York on March 19th, is expected to be a huge affair. Many out of towners who normally attend the Annual I.R.E. Convention are expected. We will have a full report and photographs of the Dinner.

Thanks to Dave, ZS6ACH we are very happy to show photographs of some of the South African SSB gang, including Empty, ZS6KD, Len, ZS6AIY, Len, ZS6NZ, Dave, ZS6ACH, Monte, ZS1RK, and Heinz, ZS6WG. We are awaiting a full story on the Wooden Horse on Empty's pan-adapter.

We are also able to present a picture of the first Single-Side Bander in South America, Corny, of YV5FL.

In next month's column we will show some excellent pictures taken by Al, W2CFT of some of the European SSB hams and their stations.

During a QSO with OD5BZ on twenty the other day I learned that his name is also Bob Adams. Mort, W2KR believes one is too many. We are looking forward to a visit from Ron, G6LX the SSB Editor of Short-Wave Magazine, who will arrive in time to attend the SSB Dinner.

Reg, W6ITH is back at the St. Martin QTH and signing FS7RT and PJ2MC for the benefit of those who did not work these rare ones last year. Mike Ercolino, W2BDS finally saw the light and will be on SSB. He bought a new Hallicrafters HT-32 and HT-33. Wait until you see what you have been missing Mike.

We are planning to attend the Dayton Hamfest on April 6th, and hope to see many of you side-banders there.

W8GM suggests that we sponsor a "Forty Meter SSB Night" in an effort to have all forty-eight States represented, with a 48 State round-table the objective. This was originally suggested by K4AU. On January 18th, a twelve state round-table was held, and the regular forty-meter gang believe such a goal could be achieved. What do you say follows? Let us hear from you.

Talking of roundtables, how many of you heard the one EMCed by OD5BZ on February 10th, in which there were more than forty DX stations working on 14310 kc.

We are sure happy to hear the big signal from ZD4BF, since he returned to the Gold Coast from a six months vacation in Europe. VS6BE, who puts a tremendous signal into the USA with his 100 foot high dipole, is going to put up a new beam. He will be off the air several weeks in March while on a vacation.

New stations on SSB include, FB8ZZ, VR3FF, MP4KDS, YS3PL, PY1NC, YA1AA, OK1AM, and ET3FL. Welcome to SSB fellows, glad to have you aboard.

73, Bob Adams, K2DW

---

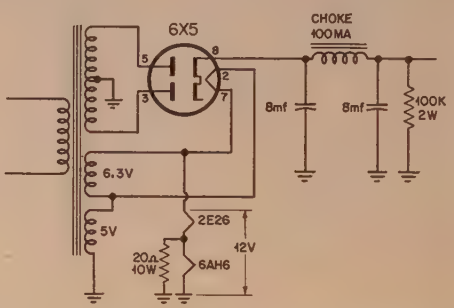
40 Meter Mobile CW

(from page 39)

while he operates from the navigator's seat.

The following little rig utilizes all of the 300 volt 100 ma vibrator supply for r.f., increasing the efficiency over phone. A power of about 25 watts input can be expected to the 2E26. A regular pentode oscillator circuit was used to make crystal switching easier by being able to ground one side of the crystal. If only one crystal position were needed the 6AH6 would be better in an untuned Pierce circuit.

The OA2 gas tube made a voltage divider for the oscillator and screen supply unnecessary. Also, the keying is much cleaner when the screen of the 2E26 is held really constant. 150 volts is a little low for the screen, but the tube



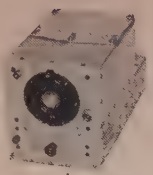
Parts List

SW1—8 position 1 pole.
C1—12 mmfd silver mica
C2—40 mmfd silver mica
C3—.005 disk ceramic
C4—50 mmfd silver mica
C5—.01 disk ceramic
C6—.005 disk ceramic
C7—.002 mica 600 volt
C8, C9—140 mmfd ape midget
C10—.01 mfd disk ceramic
R1—56k ½ watt
R2—10k ½ watt
R3—20k ½ watt
R4—1 meg ½ watt
R5—12,500 10 w w.w.
Ch1—500 μhy or larger R-F choke
Ch2—8 turns on 1 meg. 1 watt res.
Ch3—2.5 mhy R-F choke
L2—XR-50 form wind full #20 en. 18T 5 turn link
L1—CTC slug coil form LS-3 ⅜" dia 20T #34 d.s.c. 100 mmfd across or Cambridge miniature inductor 4.2-25 mc.
NE—¼ watt neon bulb
LMB—Box #138 modified with holes. (6½" x 3½" x 2⅛")

is more stable and free from parasitics. Originally a VFO was tried, but the final tuning and keying caused too severe a loss of the rig's frequency control. This was discarded for a series of crystals every 10 kc across the low end of 40 meter c-w band, decreasing the worry of out of band operation and chirps. The pi-network was also discarded in favor of the old-fashioned tank which occupies the same space.

The first two contacts satisfied me that it worked (Seattle and San Francisco), since then hundreds of 100% mobile c-w QSO's have been had with this little wonder. A quick look through the log shows 16 states worked. I'll bet you don't know anyone that worked out that well on phone! ■

COMMAND EQUIPMENT



	Used:	New:
550—1500 RECEIVER, Navy	$14.95	$19.95
530—1500 REC., Navy w/ant. loop Sw.		24.95
1.5 to 3 MC RECEIVER, Navy	7.95	
3 to 6 MC RECEIVER—BC-454	7.95	
6 to 9 MC RECEIVER—BC-455	7.95	
100—156 MC RECEIVER—R-28	10.95	18.95
2.1 to 3 MC TRANS., Navy	7.95	9.95
3 to 4 MC TRANS., Navy	5.95	
4 to 5.3 MC TRANS.—BC-457	4.95	
5.3 to 7 MC TRANS.—BC-458	4.95	
7 to 9 MC TRANS.—Navy	7.95	
100—156 MC TRANS.—T-23	14.95	

	Used:	New:
BC-456 MODULATOR	1.95	3.95
BC-451 TRANS. CONTROL BOX	.50	1.00
BC-450 3 RECEIVER CONTROL BOX	.75	1.50
THREE RECEIVER RACK	.75	1.50
CONTROL CABLE For RECEIVER	.75	1.50
12 Volt DYNAMOTOR For Receiver		4.95

(See Listing of Transformers for Above Sets.)

115 V. 60 Cyc. Pri. TRANSFORMERS:

600 VCT/100 MA—6.3 V/5 A.; 5 V/3 A. $4.95
240 VCT/35 MA—24 V/.9A; 6.3 V/.6A.; 6.3 V/.3A 1.75
1500 VCT/260 MA—6.5 V/3 A.; 6.5 V/5 A.; 5 V/4.5 A. 9.95
700 VCT/150 MA—5 V/3A.; 6.3 V/4.5 A. CSD 3.95
1890 V/12.6 MA—Tapped 2.5 V 2 A. 5.95
1100 V/80 MA—7.5 VCT/3.25 A. 5.95
662 VCT/110 MA—6.3 V/2 A.—5 V/2 A. 3.95
16 V/35 Amp 115/230 ..... $14.95 24 V/1 Amp 1.50
9 VCT—35 Amp—Tapped 4.5 V. 7.95
12 Volt—Two separate windings—4 Amp each 5.95
5 V/2 A.; 5 V/2 A.; & 5 V/6 A. 2.95
6.3 V/2.1 A.; and 5 V/3A 1.75
600-0-600 VAC—200 MA. 12.5 V/2 A.; 12.5 V @ 2 A.; 5 V @ 3 A.—#H-108—Price 8.95
250-0-250 VAC—50 MA. 24 V/1 A.; 6.3 V/1 A. —#H-109. ..... 4.95

POWER SUPPLY For Comm. REC.s

110 V.—For Army or Navy Receivers—Eliminates set conversion. For use with BC-453-454-455-946 or any sets requiring 24 V @ 1 A. & 250 V @ 50 MA. Ready to use .has 4" speaker, volume control, CW and on-off switches. Complete with cord and plug f/Rec. NEW **$18.95**

TA-12B BENDIX TRANSMITTER

Frequency 300-600 KC and 3000 to 7000 CW & MCW 100 Watt. Four separate oscillators easily converted to cover 20-40-80 Meters by using crystal for 10 Meter Band. Selector channel switch changes ECO, IPA, & Output Tanks at one time. All controls mounted on front panel. Uses 3/807, 4/12SK7; also has output Meter. Size: 15⅛" x 10¼" x 6¾". Complete with Tubes, Plug, and Cable Used **$32.95**

MP-28-BA MODULATOR & POWER SUPPLY For TA-12. Modulated Max. Signal Carrier output 75 Watts Class B. Uses 2/807, 1/6F6, 1/6N7. Dynamotor input 24 VDC, output 540 VDC 450 MA. Prices NEW @ $14.95

ANTENNA EQUIPMENT

MP-22 MAST BASE—Illustrated—Side mount swivel base, tips to 90° right or left. Has a spring snap lock in vertical position. Takes either MS-53 or 54 mast sections. Size Mtg. plate 5" x 6" x 10½". Wt. 9 lbs. $2.95

MP-22A—Same as above except takes MS-51 section, which with MS-49 & 50 makes 9' tapered antenna $2.95

MP-33—Heavy weight spring Base for MS-53 or 54 with 5" phenolic insulator. 10½" high. Requires 2" mtg. hole. Wt. 8½ lbs. $5.95

MP-37 BASE—Heavy coil spring with 8" climeter ceramic insulator. Requires 2" mtg. hole. 12" high. Wt. 10½ lbs. $5.95

MP-48—Rugged Mast Base w/Insulator above spring. Takes either MS-54 or 53 mast sections. Size: 3" D x 16½" H. Wt. 11¾ lbs. $4.95

MAST SECTIONS FOR ABOVE BASES—Tubular steel, copper coated, painted, in 3 ft. sections, screw-in type. MS-53 can be used to make any length with MS-52-51-50-49 for taper. Any section @ 50¢ each. Larger Dia. Section MS-54 ..... 75¢.

NATIONAL DIAL TYPE "N"—Precision 4" divided scale with decimal vernier drive 5-1 ratio. Planetary drive fits ¼" shaft. 100-0 scale. Prices: 3 for $5.00 — Ea.: $1.95.

BC-1158 TRANS. & MODULATOR: Frequency coverage 53.3 to 95 MC. 50 Watt. RF Doubler. Amplifier and Modulator Sections, using 4/815 and 10/12SN7 Tubes. Can be converted to 2-6-10 or 20 Meters. Complete with Tubes, Meter, Blower. Prices ..... NEW @ $39.95 — USED @ $29.95

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FAIR RADIO SALES • • 132 SOUTH MAIN ST. LIMA, OHIO

For further information, check number 18 on page 130.

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in the Nation's Capital!

Save Money — Order in Package Quantities — We Ship Around the World

All crystals tested and guaranteed to oscillate. Please include 20¢ postage and handling charge for every 10 crystals or less. Minimum order $2.50. No C.O.D's.

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25 Assorted FT-243 45 Assorted FT-241A
15 Assorted FT-171B 15 Assorted CR-1A

100 Crystals Our Choice **$8.95**

Assorted ..... Regular value $66.00

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FT-241A Crystals for Single Sideband 370 KC–538 KC

35 Crystals Our Choice **$3.49**

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HAM BAND CRYSTALS—FT-243

For operating on 80, 40, 20, 15, 10, 6 and 2 meters—on either fundamentals or harmonics.

25 Crystals Our Choice **$6.95**

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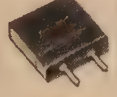
FT-243 RANGE 3655 KC –8733 KC


FT-241A RANGE 370 KC –538 KC


FT-171B RANGE 2030 KC –3995 KC


CR-1A RANGE 5910 KC –7930 KC

INDIVIDUAL CRYSTALS • Indicate 2nd choice — Substitution May Be Necessary

Low Frequency — FT-241A for SSB, Lattice Filter etc., .093" Pins, .486" SPC, marked in Channel Nos. 0 to 79, 54th Harmonic and 270 to 389, 72nd Harmonic. Listed below by Fundamental Frequencies, fractions omitted.

49¢ each—10 for $4.00 — 79¢ each—10 for $6.50

370	392	414	484	506	527	400	461
372	393	415	485	507	529	440	462
374	394	416	487	508	530	441	463
375	395	418	488	509	531	442	464
376	396	419	490	511	533	444	465
377	397	420	491	512	534	445	466
379	398	422	492	513	536	446	469
380	401	424	493	514	537	447	470
381	403	425	494	515	538	448	472
383	404	426	495	516		450	473
384	405	427	496	518		451	474
385	406	431	497	519		452	475
386	407	433	498	520		453	476
387	408	435	501	522		455	477
388	409	436	502	523		457	479
390	411	481	503	525		458	480
391	412	483	504	526		459	

79¢ each—10 for only $6.50

CR-1A
SCR 522-½ Pin, ½" SP

5910	7480			
6370	7580			
6450	7810			
6497	7930			
6610				
7380				

FT-171B—BC-610 Banana Plugs, ¾" SPC

2030	2155	2305	2532	3250
2045	2220	2360	2545	3322
2065	2258	2390	2557	3995
2105	2260	2415	3202	
2125	2282	2435	3215	
2145	2300	2442	3237	

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FT-243 — .093" Dia. — .486" SPC

49¢ each—10 for $4.00

4035	5740	6350	7506	7775
4080	5750	6373	7520	7800
4165	5773	6375	7525	7806
4190	5780	6400	7540	7825
4280	5806	6406	7550	7840
4340	5840	6425	7573	7841
4397	5852	6673	7575	7850
4490	5873	6675	7583	7873
4495	5880	6700	7600	7875
4840	5892	6706	7606	7900
4852	5906	6725	7625	7906
4930	5925	6750	7640	7925
4950	5940	6775	7641	7940
5030	5955	6800	7650	7950
5327	5973	6825	7660	7975
5360	6206	6850	7673	8250
5385	6225	6875	7675	8273
5397	6240	6900	7700	8300
5437	6250	6925	7706	8310
5485	6273	6950	7710	8316
5500	6275	6975	7725	8320
5660	6300	7450	7740	8630
5675	6306	7473	7750	8690
5700	6325	7475	7766	
5706	6340	7500	7773	

79¢ each—10 for $6.50

3735	6450	6650	8280	8650
6025	6473	7000	8350	8690
6042	6475	7075	8375	8700
6073	6500	7125	8425	8733
6075	6506	7150	8430	
6100	6525	7300	8450	
6125	6550	7306	8475	
6140	6573	7425	8500	
6150	6575	7440	8525	
6173	6600	8173	8550	
6175	6606	8175	8575	
6185	6625	8225	8600	
6200	6640	8275	8625	

SPECIAL—200 KC in FT 241A Holder—$1.25. Without Holder 39¢ ea. -3 for $1.00

For further information, check number 39 on page 130.

Transmitter

[*from page 35*]

The plate current in Class B linear for AM operation has essentially no variation, therefore, stabilization is not a problem. Should the operator desire to increase power on his present all band exciter, which is only desired for AM service, this amplifier will do a beautiful job. This circuit, to be effective, must employ the 4W250B or 4W300B to successfully operate this circuit as described. Any substitution will prove disappointing in results. Screen and grid voltage supplies must be loaded and stabilized for all linear operations.

If the final amplifier is carefully adjusted with the proper antenna load and plate current, no screen current will be present. On the other hand, if the grid of the tube is over driven, or if under-coupled on the antenna screen current will be present and TVI will result. With the antenna over-coupled and with adequate grid drive the screen current will go negative. We have found it possible to operate with the screen potential up to 600V DC, provided all of the circuits are properly tuned and zero grid and zero screen current is maintained. The equipment described operates with 300 on the screen and 350 maximum d.c. on the plate at 2850V. Long tube life and extremely stable operation are the end result with such operation. Reduced output is evident with less than 2200 volts on the plate and less than 300 on the screen.

It has been my experience that water cooled tubes give longer life and best operation since anodes can be properly cooled. Water cooling is accomplished by circulating water in a five gallon glass container. The closed system uses distilled water and the cooling is proportionate to the temperature of the water. Air cooling was considered but the abnormally high cost of a blower and its associated noise made air cooling impractical. Radiation cooled tetrodes have been eliminated because of the high drive requirements and the difficulty in keeping TVI down. The vacuum capacitors and vacuum switches with their diminutive size and high efficiency work hand in hand to produce a well balanced amplifier.

Conclusion

After operating this equipment on the various bands with its simplicity, flexibility and stability I felt that you all would like to know what is possible in the line of modernization and not be tied down to all of the routine required in the conventional band switching equipment now available.

Somebody may bring up the question as to the cost involved in all of these vacuum components, but when the values are weighed I felt that the cost was well justified.

perimeter is .0739 inches from the stator plate ahead, as seen from the rear; and .0016 inches from the stator plate behind as seen from the same position. Both these dimensions must be measured from the geometric center in a logarithmic curve from the outer point of contact with the rotor shaft proper.

If you have any difficulty in extracting the plates, a special tank capacitor plate extractor can be purchased from any wholesale supply house handling this item.

Coil L1 is 3¾ turns of #27 dcc wound on a 2-3/11 inch form. This can be made from materials on hand or purchased ready made (BLG #42X17P). They come in seven foot lengths and cost $38.50. The other six feet or so will be very useful around the shack so don't throw it away.

With the exception of L7, the other coils are wound on standard 4/7 inch forms, according to the table.

L7 is 14 turns of #18 wire wound on a 2½" diameter form. L7a is 3 turns on a 3" form wound inside L7.

Everything is standard except for the components and the circuit. Resistor tolerances are standard except for R7, which must be of the automatic humidity compensating type. (Bolar-R77Q-1)

Condensers

Capacitors are standard silver micas, except for C3 through C74, which must be of the dual mica layer, tapped dielectric type, plus or minus .001 percent. C76 is the special RF proof jacketed type since it provides RFC3 and R-16 with the by-pass neutralizing component during the upper side-band shift caused by the necessity for resetting the tank capacitor after sufficient warm up period. If the value of this capacitor does not give linear performance over the entire lower 2 kc frequencies of the 420 mc band, substitutions may be made, starting at .000057 mfd, and increasing the value one mmfd at a time until the sine peak rounds out to give the proper curve response dip 12 degrees off center in the pass band.

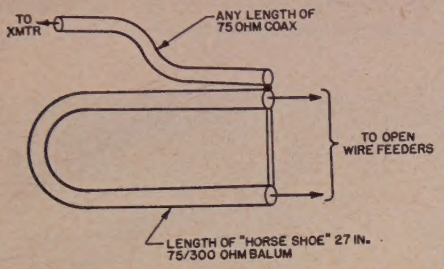
Wiring is not critical, except that no leads must be over one inch long and all leads carrying RF must be at least ½" from all AF leads. Dress the leads so that none crosses the other at an angle of less than 130 degrees.

Catalogue prices of all components come to less than $183.00, but a little scrounging around in the junk box should come up with a mess of junk.

Much thought and study was given to this design. Simplicity was the keynote, with the Limited Facilities of the Novice Operator foremost in mind.

Now, let's go to work, shall we? ■

Since the ARC-5 rig was designed to work into a co-ax line and all beams should be fed with that beautiful and low, low loss open wire



line, a balun should be inserted between the ARC-5 output line and the open wire feedline.

Power Supplies

A single supply of 400V-250 ma and 12 or 24 volts a.c. will allow a plate input of 30 watts to the final. Since power supplies of this rating are covered fully in the various handbooks, it will not be presented in detail here. The modulator, also, is standard textbook design using 6V6's to provide 15 watts of audio.

Range

Several of these ARC-5 units are currently in use here in eastern Alabama, and experience has shown that over the rolling hill terrain and using 5 to 12 element beams the 100 mile hop to the locals can be made nightly, with the average reliable range to be on the order of 150 to 175 miles with 300 mile DX worked occasionally.

Naturally after a period of "feeling out" the band, the high power bug bites and you have a nice exciter capable of driving a pair of 826's or 4-125's to a half gallon for that rock crushing signal.

So good hunting to you on two meters. ■

After Thoughts

After some months of operating and several conversions according to the previous instructions it became apparent that the turret motor didn't always respond as written up. However, by modifying slightly, all units ran without failing.

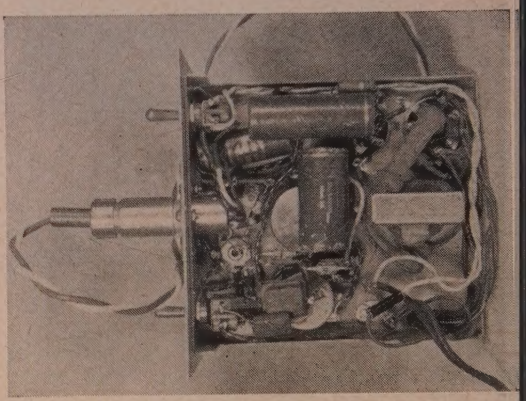
Solder together the two wires coming from the side of the motor and tape up.

Remove brushes and with an ohmmeter determine which brushholder is grounded internally.

Solder the AC Lead coming from the push to rotate switch to the ungrounded holder. Replace brusher and merely rotate away.

Meter [*from page 29*]

to calibrate the lower range by plugging the meter into the headfone jack of a receiver and adjusting the potentiometer to 600 cycles. If nothing else is available the high range can be set by means of the ten kc beat note between broadcast stations in the standard AM band.



Bottom View

To use, merely plug into the circuit under test. Since the readings are proportional only to frequency the waveform makes little difference in readings. About ½ volt at 500 ohms is sufficient to saturate the limiter and give stable readings. The input is brought out to a three pin Cannon plug which allows measurement of both balanced and unbalanced circuits.

The greatest use to which this meter has been put so far is in measuring radioteletype frequency shift. In this application all that is necessary is to zero beat with the receiver b.f.o. the mark channel then, without touching the receiver, key the transmitter to space. With the receiver output feeding the meter read directly the amount of shift. In this application a source of error may be the receiver inability to pass frequencies below 100 cycles. However the signal is generally still there though greatly attenuated. By bringing the audio gain control up an accurate reading can be obtained.

Construction of the meter is straightforward with no critical parts or parts placement. All components fit easily on a 5½" × 5½" subchassis secured to the 6" × 8½" panel. The cabinet size is 6" × 6" × 8½" and was formed from 18 gage steel. Several commercial metal boxes are available for a portable type mounting or it can be built on a rack panel for permanent installation.

With the new RTTY regulations concerning frequency shift equipment of this type becomes almost a must at the station. Whether the shift is 850 cycles, 170 cycles or some other standard, unless we can all get together all we are going to do is talk to ourselves.